Group Dynamics: Relational Learning through Liminoid Problem-Solving Teamwork

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ABSTRACT

This research developed a novel synthesis of four theories using connections discovered through a literature-review: this synthesis was called the Modulated Liminoid Group Learning Synthesis (MLGLS). A mixed-method exploratory experiment was developed to collect and analyse participants' experience in problem-solving teams in the United States, the United Kingdom, and Hong Kong. This study found that problem-solving groups experienced a cyclic process of group development, personal investment, and liminoid or flow-related engrossment within liminoid communitas. This cyclic process occurred while the group worked together to develop enough understanding of an activity to solve it. After this group process, a direct debrief produced transferrable relational learning during a post-liminoid state. This study confirmed the occurrence of Liminoid Group Learning processes.

The findings of this study concluded that participants in problem-solving groups build temporary communities that result in powerful relational learning. The development of these temporary communities allowed participants to reflect on how they wanted their current group to function, developing their conclusions about how future groups should operate. Participants' reflective conclusions about current and future groups, called relational learning, is a powerful learning outcome for practitioners to employ because it provides a framework for producing inter-relational growth. Another finding of this research underscores the importance for participants to personally invest themselves in group activities because it jump-starts a group's development. Personally investing in a group activity is a critical aspect that leads to a group's formation, ability to solve a problem, and resultant relational learning. The findings of this study provide applicational tools for both the group dynamics facilitator as well as the group participant that produce improved relational abilities in future group dynamics scenarios.

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The liminal journey toward this a PhD has had challenges, but in those challenges there have been pockets of communitas which have delivered me to the post-liminal place. I would like to take this opportunity to thank those important people who have been my communitas on my journey.

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PREFACE

This research project emerged from a primary interest in how groups and teams work together and the relational learning processes that resulted from the interactions during group problem-solving. A group of co-working humans is one of the most complex systems to investigate through research: multiple academic disciplines seek to describe different aspects of group dynamic processes. In light of the vast amount of multi-disciplinary research about group dynamics, it seemed impossible to represent all the relevant literature in the literature review and analysis chapters of this thesis. Nevertheless, every effort was made to give an appropriate treatment of immediately relevant literature about liminoid concepts, flow theory, experiential learning, and group dynamics or group problem-solving.

With liminoid concepts, flow theory, experiential learning, and group dynamics being the focal points of this research, they receive magnified attention in the literature review and analysis chapters. This preface aims to pay respect to the array of additional works that influenced this research project. John Dewey's (1906, 1916) proto-experiential work, Jean Piaget's (Ginsburg and Opper, 1988) developmental learning work, Kurt Lewin's (1947) group dynamics work, Lev Vygotsky's (1979) Zone of Proximal Development, Abraham Maslow's theory of motivation (1958), and Chris Argyris's (1990) writing about organizational dynamics all influenced this research. There are areas where further discussion between this research and other existing scholarship could continue, such as with John Adair's (1973) leadership writing or Benjamin Bloom's education taxonomy ideas (Anderson and Bloom, 2001). Beyond that, there are numerous areas of practical application in team sport, business management, healthcare, community development, and elsewhere that this research holds relevance. This research could not practically interact with all these scholars and their respective disciplines. Instead, it pays respect to their influence and hopes for future research to continue developing a holistic understanding of group dynamics.

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1. Chapter 1 – Introduction

This chapter introduces a research problem occurring within current group facilitation literature. Then, this chapter proposes a broad research question that allows the exploration toward possible answers using a mixture of methods. This introduction then presents a cursory introduction of relevant literature for the study. The research uses that relevant literature to produce a novel synthesis of multiple theories called Modulated Liminoid Group Learning Synthesis (MLGLS). A preliminary explanation of the experimental design is also shared. These short, initial explanations serve as a starting point for the reader in understanding how this research leads to practical implications for group facilitators.

1.1 Research Problem

Group facilitation requires an understanding of the complex nature of group interactions. Today's facilitators have numerous resources available that instruct facilitator of individual behaviour and group dynamics (Miles and Priest, 1999; Priest and Gass, 2018). Group dynamics theories available to facilitators can come from top-tier academic journals (Tuckman and Jensen, 1977; Attarian and Priest, 1994; Beames, 2004; Schenck and Cruickshank, 2015), textbooks (Jarvis, 1995; Miles and Priest, 1999; Priest and Gass, 2018; Kolb, 1984/2018), business leadership reading (Argyris, 1990; Kotler, 2014; Gray, 2016), and anywhere in-between (Csikszentmihalyi, 2008). The branding of these resources varies using terms like "leadership," "group dynamics," "team-building," and "facilitation." These theories describe one dimension of a dynamic group interaction: the stages through which the group develops (Tuckman and Jensen, 1977), the experiential learning process of an individual in a group (Kolb, 1984/208, Schenck and Cruickshank, 2015), or the feeling of optimal experience within a group (Csikszentmihalyi, 1975). The problem with these one-layered understandings of processes that happen in groups is that they happen alongside of a multitude of other processes. Much research describes single-layer processes of group

dynamics, but more research is needed to understand how these single-layer theories work in harmony.

Having all these single-layer theories may create challenges for facilitators. Facilitators might find it challenging to distinguish which theories to use in practice. Is the decision over which theories to use for one's group facilitation philosophy based on the popularity of a particular theory, current trends, or academic discipline preferences? The first part of the research problem is that there are too many group facilitation theories available under a broad range of terminology. When too many theories are observed in one's field, a common research practice uses literature comparison methods to condense similar theories into one (Tuckman, 1966; Fischer, Greiff, and Funke, 2012; Mango, 2018). Those studies condense theories from within a single field. This research suggests that facilitators have a problem because they need functional knowledge of multiple theories across several disciplines.

The second part of the research problem is that these group facilitation theories only clarify a portion of the multi-layered set of processes taking place during group work. Consider that facilitating a group for learning outcomes requires a facilitator to understand how groups function together, to understand how individuals operate within a group at an individual and psychological level, and to understand how to produce learning outcomes from a facilitated exercise. This short list of three facets of a group represent sociological, psychological, and educational disciplines: all of which have multitudes of research for facilitation theories (Csikszentmihalyi, 1975; Tuckman and Jensen, 1977; Attarian and Priest, 1994; Kolb, 1984/2000; Schenck and Cruickshank, 2015) A group of individuals is a dynamic organism that facilitators must understand to an extent to successfully produce learning outcomes with that group. As a result, group facilitators enter into practice and collect a piecemeal of theories that offer a partial understanding of their group's dynamics.

Some facilitators condense enough theories into their personal paradigm to work effectively, but could a group of these types of theories be presented to facilitators together for practice? If the first part of the research problem is that there are too many theories explaining the group facilitation process, the second part is that these theories only offer facilitators partial explanations of the manifold processes taking place within their facilitated groups. Group facilitators have a philosophy that governs their group facilitation skills. Such a philosophy of "how to facilitate a group" could include anything from biased assumptions like "loud people make poor leaders" to academically researched theories such as Group Developmental Stages Theory (Tuckman, 1966; Tuckman and Jensen, 1977). Facilitators consciously and unconsciously integrate a selection of assumptions and theories into a practical philosophy of group facilitation.

When developing a practical philosophy of group facilitation; however, facilitators are faced with three main problems. First, they must receive exposure to helpful and supportable group facilitation theory that confronts misunderstanding and poorly guided facilitation strategies. Second, they must be able to understand and apply that theory in their practical facilitation of a group. Third, they must be able to integrate a new theory into their pre-existing philosophy of group facilitation. Research has described these three-stages as transformational learning (Meyer and Land, 2003; Meyer, Land, and Baillie, 2010). Transformational learning happens as a learner encounters a novel or troublesome concept. When the learner understands and incorporates this transformational concept into their paradigm, they approach the world in a new way. This same process must take place for facilitators, but research needs to demonstrate what selection of troublesome concepts might describe group processes in a way that aids facilitators.

Many have sought to address the problem of duplicitous facilitation partial theories by writing compendiums of leadership and facilitation theories. One example arises in the

outdoor education discipline with the textbook *Effective Leadership in Outdoor Programming* (Priest and Gass, 2018). This resource is a quality, updated, field-specific, and academic book. After reading this type of resource, a facilitator should ideally be able to apply the many facilitation paradigms in such a book to their practice. This approach leaves the facilitator to discover how those paradigms of group work fit together, presumably through trial and error. Research could explore whether bundled group process theories are working together to present them as one unit to the practitioner. As a result of these conditions, the stated final research problem of this project is this: There are too many single-layer group dynamics theories, this creates a problem for facilitators who need to know how single-layer theories operate together to aid their facilitation of the multi-layered process of group learning.

1.2 Research Question

Some single-layer group dynamics theorists suggest that there are interconnections with other theories in their writing (Turner, 1974; Nakamura and Csikszentmihalyi, 2014; Schenk and Cruickshank, 2015). Interestingly, these researchers propose theoretical interconnections across different disciplines, including psychology, neuroscience, education, and even anthropology. This research project uses those suggested connections to develop a model of group dynamics for testing. The theories that this thesis synthesizes into a single model include Liminoid Theory (van Gennep, 1960; Turner, 1969; 1974), Co-Constructed Developmental Teaching Theory (Schenck and Cruickshank, 2015), Group Developmental Stages Theory (Tuckman, 1965; Tuckman and Jensen, 1977), and Flow Theory (Csikszentmihalyi, 1975). In short, this research asks whether research can develop broader, multi-layered understandings of group processes by observing multiple theories simultaneously. This research also investigates whether such a broader understanding can be modulated by a facilitator to produce different learning outcomes for participants.

This research proposes a new synthesis of understanding group dynamics for facilitators: the Modulated Liminoid Group Learning Synthesis (MLGLS). MLGLS comes from suggestions by the theorists who proposed the theories which make up the MLGLS. The literature review addresses the aspect of the research problem that suggests that there are too many partial group dynamics theories available by condensing four important theories into one synthesis. Importantly, the research problem also indicates that the synthesis needs testing to determine whether it might serve as a beneficial tool for facilitators. Incorporating MLGLS into an experiment and explore the resulting experience of participants should offer some indications about whether the MLGLS is a useful tool for modulating liminoid group experiential learning. The research question for this project is: "What is the experience of participants in a modulated liminoid group learning activity?"

The research question is neither qualitative nor quantitative: it is a broad, mixed-methods question (Creswell, 2014). The research question's wording allows for a wide range of data collection methods and analytical procedures to take place to discover possible answers. Emergent qualitative data can be used toward a possible answer of the research question. This research can also use numerical, quantitative data to explore possible answers to the question. The qualitative and quantitative sections of this research will contain more familiar elements (e.g. quantitative hypotheses and emergent qualitative themes), but the research question itself must remain broad to incorporate many data types.

The Modulated Liminoid Group Learning Synthesis (MLGLS) consists of four theories. Those four theories are Liminoid Theory (Turner, 1969), Flow Theory (Csikszentmihalyi, 1975), Co-Constructed Developmental Teaching Theory (Schenck and Cruickshank, 2015), and Group Developmental Stages Theory (Tuckman and Jensen, 1977). These four theories are not chosen arbitrarily or because of their academic popularity; instead, they synthesize into the MLGLS following theorized connections to each other by

their respective theorists. While the literature review will explore these theorized connections, this section intends to offer an initial explanation of each theory. The intention of synthesizing the connections between these theoretical concepts is to develop that synthesis of group dynamics to test in exploratory research. It stands to reason that introducing such a synthesis into the research design will allow exploration into participants' experiences in relation to the synthesis. Resulting findings might offer implications for group dynamics facilitators.

1.3 Concepts

1.3.1 Liminoid Theory

The Modulated Liminoid Group Learning Synthesis begins with Liminoid Theory. The term liminoid originates from the concept of liminality. Liminality describes an ethnographically observed phenomenon articulated by a cultural anthropologist named Arnold van Gennep in *The Rites of Passage* (1960). The term liminal indicates transitional "rites of passage" that pre-industrial community members would participate in as they transitioned from one life stage to the next. Examples of these transitions are puberty, marriage, childbirth, and death. Another anthropologist named Victor Turner revived Arnold van Gennep's work (1969) and coined the term liminoid in a further study (1974). The term "liminoid" describes post-industrial transitionary moments in a person's life allow personal development, but that do not necessarily change one's communal or societal status (Thomassen, 2014). Van Gennep and Turner's ethnographic research noted that human tribes (usually pre-industrial) developed rituals around significant cultural moments of life transition: rites of passage. Both ethnographers agreed that passing through a rite of passage included three phases. The three phases of a rite of passage were pre-liminal, liminal, and post-liminal. The key phase of transition in a rite of passage is the liminal phase: a temporal, middle state where status is in flux.

In 1974, when Turner wrote *Liminal to Liminoid in Play, Flow, and Ritual*, he made the distinction between liminality and liminoid phenomena. Turner intimates that liminality functions within an overarching cultural context. In contrast, liminoid phenomena allow for a critical perspective of culture without indicating the same cultural transitional rites (i.e., puberty rites, marital rites, funerary rites). Turner says that liminoid phenomena "…are often parts of social critiques or even revolutionary manifestos-books, plays, paintings, films, etc., exposing the injustices, inefficiencies, and immoralities of the mainstream economic and political structures and organizations." (Turner, 1974, p. 86). The liminoid phase describes a period of time in space where facilitators can invite learners to gain perspective through reflection upon aspects of their personal behaviour, group dynamics, and cultural assumptions.

1.3.2 Flow

Psychologist Mihaly Csikszentmihalyi's developed Flow Theory (1974, 2008). Flow is the achievement of optimal experience. Flow can occur for an individual or as a group when challenges faced in an activity equal the skill level of participant(s) in that activity. Flow is commonly associated with high performing athletes (Kotler, 2014); however, flow states can be achieved during activities as menial as trimming fingernails (de Vries, 1992). Flow describes the sensation of an optimal experience, but an optimal experience may differ from person to person. The key to having an optimal experience is that a person perceives their skills in an activity to match the challenge level of that activity. Flow has seven, counterpart, anti-flow states that a person or group experiences when challenge levels are incongruent with their skill level. These anti-flow states are apathy, boredom, relaxation, control, emotional arousal, anxiety, or worry (Csikszentmihalyi, 1975, 2008). Flow and anti-flow states explain participant and group reactions to challenge and skill level ratios in group scenarios.

1.3.3 Co-Constructed Developmental Teaching Theory (CDTT)

Co-Constructed Developmental Teaching Theory incorporates neuroscience with experiential learning. CDTT consists of five steps and two “signposts” (Schenck and Cruickshank, 2015). The first step is the framing of an activity, which is the introduction or explanation of an activity to participants. Second is the activity itself. The third is the direct debrief of the activity. A direct debrief happens when learners respond to reflective questions about the activity. Next, the pause signpost happens when the brain takes a break from debriefing and internally reflects. Fourth, bridge-building happens when the brain builds connections between newly learned information from earlier steps and previously assimilated information. Fifth, the learner fully assimilates information after bridge-building by merging it into their paradigm. The second signpost and final part of CDTT is connected closely to assimilation. This signpost occurs when learned information fully enters into the autobiography of the learner and is used for future cycles of CDTT.

It is important to note that CDTT is the newest and perhaps least well-known theory that comprises the modulated liminoid group learning synthesis. CDTT developed through the experiential education discussion. Experiential education received significant attention in the 1980s when David Kolb developed a model and explanation of experiential learning called the Kolb Experiential Learning Theory (KELT) (1984/2014). Jean Piaget, John Dewey, and Kurt Lewin served as Kolb's inspiration (Miettinen, 2000; Kolb, 1984/2014). KELT has been thoroughly critiqued or updated by those such as Joplin (1981), Jarvis (1995), and Schenck and Cruickshank (2015). Kolb himself offered an update in 2014. All of these researchers agree upon a cyclical state of learning which happens through experience. The most significant critique of Kolb centres on Kolb's learning style inventory (LSI). The LSI describes different learning modes, some people being more inclined to one mode or another. Kolb claims that the LSI is based upon brain science, but Schenck and Cruickshank

offer reasonable arguments against those notions with neuroscientific studies of their own (2015). After rejecting the KELT and LSI, Schenck and Cruickshank offer a new model of experiential learning called Co-Constructed Developmental Teaching Theory.

1.3.4 Group Developmental Stages Theory (GDST)

Group Developmental Stages Theory (GDST) asserts that a group will work through five stages of progression throughout its life cycle: forming, storming, norming, performing, and adjourning. Bruce Tuckman initially noted four stages of group development that occurred in both "interpersonal vs. task" realms (Tuckman, 1965). The task versus relationship continuum describes the two dimensions in which each stage of group development happens: each group must focus both on the task at hand and those they relate with to accomplish said task. The stages Tuckman put forward were forming, storming, norming, and performing. Others studied group stages following Tuckman's original article in 1965, studying groups of people in isolation at the Antarctic research camp (Smith, 1966). The best effort to empirically test Tuckman's hypothesized stages of group development and task versus relation realms came several years later (Runkel *et al.*, 1971). Helpfully, Runkel *et al.* gave succinct definitions for the four stages for task and relationship. The first set is for the task dimension of the four group developmental stages: "(1) orientation to the task [forming], (2) emotional response to the task demands [storming], (3) open exchange of relevant interpretations [norming], and (4) the emergence of solutions [performing]" (1971, p.181; bracketed items added for clarity). The second set is for the relational dimension of Tuckman's four group developmental stages: "(1) testing and dependence [forming], (2) intragroup conflict [storming], (3) development of group cohesion [norming], and (4) functional role-relatedness [performing]" (1971, p.181; bracketed items added for clarity). With these helpful definitions, some conceptual development was lacking in how groups come to a close.

Another concept that needed inclusion within the four-stage model described how groups came to a close. Tuckman's ideas developed to answer that concern when the fifth phase of adjourning was added (Tuckman and Jensen, 1977). Tuckman and Jensen synthesized all group developmental stages research up until that point introducing their familiar five-step model: forming, storming, norming, performing, and adjourning (1977). About half of the articles written up to this point were empirical research where group stages were identified and categorized between several researchers. Tuckman and Jensen notably offered criticism of Runkel *et al.*'s (1977) methods. Nevertheless, the fifth stage of adjourning found recognition in Group Developmental Stages Theory.

Later, Attarian and Priest (1994) developed the task versus relationship dimensions in group stage theory by explaining more clearly how task and relationship interacted through each stage of small group development. They supposed that each group stage requires varying priorities on a continuum of task versus relationship. Attarian and Priest's article is pivotal like Tuckman's (1965) and Tuckman and Jensen's (1977), but has only one case study in the article to illustrate the theory. GDST has been retested (Attarian and Priest, 1994) over the years and is still recommended for practical use today (Solid Rock Outdoor Ministries, 2012; Priest and Gass, 2018). This research seeks to ask questions which indicate where group members are in their group developmental stages as well as in their prioritization of task and relationship.

This study seeks to define the theorized connections between these four theories and produce a novel synthesis to then test the synthesis in an exploratory manner. Testing the synthesis in an experiment could help determine whether macro-theoretical approaches to group dynamics could be useful in future research. Studies like those which support Liminoid Theory, Flow Theory, CDTT, and GDST have sought to explain parts of the group dynamics

process; however, this study seeks to explore the overarching, symphonic process of a working group.

1.4 Researcher Position

This research project, constructivist in origin, developed out of a personal study and interest in group dynamics and facilitation. I searched through books like *Effective Leadership in Outdoor Programming* (Priest and Gass, 2018) or Karl Rohnke's activity guides in order to learn facilitation skills. It felt like there were so many great ideas about how to facilitate groups, but I had no idea which ones to use or if they could work together. I have met several, often new outdoor learning facilitators who had similar feelings. As a result of this research problem, I began my own pragmatic inquiry without even knowing what pragmatism was (Creswell, 2014). I started searching for theories that described group processes in a way that to improve my facilitation skills, receiving anecdotal feedback from students in classes. I also considered how those theories fitted together in my philosophy of group facilitation. As a result of my personal interest in this study, I will bring motivations and biases to the research. This position statement hopes to offer recognition of these motivations and initiate the process of recognizing researcher biases as well.

I was first inspired to research the topic of modulated liminoid group learning synthesis in a class I heard about during my undergraduate work in university. As students often share their opinion about various classes, people had wild opinions about this class called "Applied Outdoor Education." Some people hated the course, and others loved it: I had never heard such strong opinions about any course before. I was intrigued, but I would not have time to take this class until I became a graduate student.

Once I entered my masters program, my academic focus shifted to outdoor education. I decided to take the class I had heard all of the rumours about. It was called Applied Outdoor Education or "Applied" for short. Applied was an admittedly strange experience. Instead of

meeting in an indoor classroom at a decent hour, all of us students met outside at 6:00 A.M. in the dark. At first, we did icebreaker activities and listened to a few talks on leadership concepts, but the majority of the class was a multi-week problem-solving initiative called "the pure democracy problem." Most students called the pure democracy problem "liminal" or "being put into liminal."

I had never heard of liminal, but I was intrigued by the activity. In the pure democracy problem, students equally shared the power, control, and authority of the class leadership. Our task seemed simple. We received instruction to move from our outdoor classroom to an indoor classroom. If anyone tried to usurp the power, control, and authority of others in the group by saying something like "We should all go inside," the professor of the class would call a violation. It is an abuse of said power, control, and authority to push your plan on everyone else about how to go inside. Over several weeks, we struggled over how to speak to one another, work together, and value each other. Interestingly, the professor seemed to have an uncanny ability to make each course just challenging enough to where you were learning, somewhat frustrated at lack of progress, and wanting more.

As a result of this strange learning experience, I began studying liminality. *Effective Leadership in Outdoor Programming* (Priest and Gass, 2018) made a profound impact on me. In that book, I read about Group Developmental Stages Theory and experiential learning. The more I studied these theories, the more I realized they were happening simultaneously. In that clarifying time, I imagined this research project. I wanted to put some of these theories together and research whether they occur as simultaneously operating systems within groups.

During my literature review, I grew excited as I found out about another theory that seemed to overlap with liminality, Group Developmental Stages Theory, experiential learning, and Flow Theory. What piqued my interest even more was that the people who theorized about these four theories, made countless suggestions that they were connected. As

a result, I merged these theories together by using the theorists' recommendations and have produced an experiment.

This experiment comes from a lifetime of interacting with different kinds of groups in varying sectors: volunteer groups, business teams, education groups, sports and hobbyist groups, and family groups. I have over ten years of experience leading groups into the outdoors, with about five years of leading group dynamic focused initiative activities. With this exciting development I discovered in my reading paired with my experience of leading groups and activities, I produced this experiment and its resulting research.

In my story, my inspiration and personal connection to this research are hopefully evident; however, my biases should come forward as well. I see how investment and personal commitment to this project could provide pressure to sway me toward deduction and confirmation bias (Suter, 2012) in my analysis, but this would be out of line with ethical research practice. My story could also offer bias to my methodology. Being pragmatic about exploring possible truth could be taken to the extreme, resulting in findings that are not indicated by the data.

Despite these biases, it would also show poor judgment to exclude the voice of the researcher in this research. Such a decision would discount five years of thoughtful hypothesis about and experience working with these theories in group facilitation practice. Therefore, this thesis will include sections written with personal pronouns to indicate the use of the researchers' reflexive voice. The hope is that five years of observation and reflection about group work will shine through in reflexive writing and provide more data to inform the process. Personal investment loads this research with a deductive weight and possible confirmation bias. While deduction is a strength with respect to the quantitative matters associated with this research, it could disallow the researcher from unbiasedly listening to, representing, and interpreting the voices of participants rendered in the qualitative aspects of

this research. The way this research intends to mitigate deductive weighting is to report deductive and inductive data when discussing qualitative matters specifically. This effort should introduce transparency into the research to display whether the researcher has reached biased conclusions (Given, 2008). The main precaution against confirmation bias taken in this research was to transparently report aspects of the hypothesized synthesis which were confirmed, denied, and refined. This research chooses to occasionally include the researcher's voice in this research while taking steps to mitigate researcher bias; these measures help this research represent the meaning expressed by participants while mitigating the influence that the researcher may have in the process.

It must be stated that a major motivation and strength of this research stems from the researcher's personal experience. This research effort is based upon five years studying liminoid, flow, experiential, and group developmental concepts in group contexts. The researcher views these concepts as working harmoniously. This research project intends to explore the connections between those concepts with academic rigor, moving beyond personally motivated conjecture. This research intends to make pragmatic, critical inquiry into those theories to refine the understanding of their connections or disconnections that may have overlooked or incorrectly hypothesized upon leading up to this research.

Thus far, the expressed position of the researcher shows investment and experience with group dynamics theory. While the expression has been thoughtful, it could also be transparent to share the actual narrative data from the researcher's history. The intent of sharing this data is to illuminate the development process for this research and to open a lens for other scholars to consider sources of possible bias that the researcher may be unable to see. In response to the researcher's position expressed here, steps are taken in the methodology chapter to generalize interpretation by factoring in data from multiple sources

throughout study. After presenting a personal narrative history here, this section also offers some reflexive considerations to develop a robust researcher position statement.

Another prominent bias in this research project comes from my background as a person from the South-eastern United States working with groups in that cultural context. In a research effort that hopes to explore generalizations about any group using convenience sampling, samples would have to come from beyond the South-eastern USA. Efforts to mitigate a cultural bias therefore included convenience sampling in the United Kingdom and Hong Kong in addition to the United States.

The position of this research is ultimately one that has made every effort to understand possible biases that could result from personal investment and cultural background. While these efforts in transparency and reflexivity through autobiographical narrative may be well-placed, they do not entirely remove the possibility of bias. Ultimately, this researcher is committed to mitigating biases in order to produce work that could hopefully help other facilitators of group work.

1.5 Research Plan, Place, and Design

This research employs pragmatic, exploratory, mixed-mixed methods (Creswell, 2014) to uncover and analyse data to attempt to answer the research question. Pragmatism allows for inquiry that focuses on useful results in practical implications (Lewis-Beck, Bryman, and Futing Liao, 2004). It is useful in exploratory studies like this one which tests a completely novel synthesis (2004). Using a mixed-method approach allows for broad inquiry in a study while also allowing the study to take place in an unexplored area (Ihantola and Kihn, 2011). This mixed-methods study is a convergent parallel mixed-methods study where quantitative and qualitative studies are conducted and then integrated into the interpretation of overall results (Creswell, 2014).

1.6 Research Aims and Objectives

This research aims to produce and test a new synthesis of theories related to group dynamics called the Modulated Liminoid Group Learning Synthesis (MLGLS).

The objectives required to meet this overall aim were:

1. Hypothesize the MLGLS from a literature review.
2. Use a group activity called Traffic Jam (Rohnke, 2009) to explore whether the MLGLS offers an accurate description of participants in the activity.
3. Collect quantitative and qualitative data to explore participants' experiences in Traffic Jam.
4. Analyse the data collected during the experiments to determine whether the proposed MLGLS matches the experience of participants in Traffic Jam.

This process aims to produce a multi-layered description of group processes to aid group facilitators in practice.

1.7 Research Constraints

While this research project intends to put forward a new, exploratory theory of group dynamics, it cannot produce an ultimate or final understanding of group dynamics. The nature of pragmatic research is that it produces tentative conclusions that can never be proven to be infallible and which are open to further refinement. Another constraint of this study is the scope. While this research project hopes to make broad, universal statements about groups, there is no way to consider every piece of literature written about such an expansive topic. While this research intends to progress a multi-layered understanding of group dynamics, it cannot produce a final theory on the expansive topic of group dynamics.

1.8 Introduction Summary

With so many theories available to group facilitators, this research seeks to explore whether the synthesis of four of those theories could produce a condensed synthesis useful

for practice. The theories this research will aim to synthesize and test through the development of a new questionnaire will be Liminoid, Flow, Co-constructed Developmental Teaching Theory, and Group Developmental Stages Theory. The literature review will produce a synthesized theory (the MLGLS), which then informs a questionnaire and designed experiment. The experiment will include a facilitated group activity, where participants are recruited using convenience sampling. Follow-up measures include questionnaires, debriefs, and emailed questions producing scale and narrative data. Scale data is interpreted and analysed using confirmatory factor analysis and structural equation modelling. Narrative data is analysed in one particular group using a thematic coding approach. These two resulting findings in a concurrent mixed-methods design will then be considered in light of each other. It is hoped that his research produces a new model of group facilitation that can be used by practitioners.

2. Chapter 2 - Literature Review

2.1 Purpose of the Literature Review

The purpose of this literature review is primarily to demonstrate suggested connections by theorists of Liminoid, Flow, Co-Constructed Developmental Teaching Theory, and Group Developmental Stages Theory. This literature review searched for academically suggested connections between each of the four theories. These suggested connections served as the basis for merging together a hypothesized synthesis of those four theories: this research named that synthesis the Modulated Liminoid Group Learning Synthesis (MLGLS). This chapter also presents a discussion about the use of liminoid terminology over liminality, especially in the context of outdoor education. The final result of this chapter produced a model that illustrated the MLGLS to incorporate it into an experiment.

2.2 Liminoid Theory

The introductory discussion about liminoid suggests that it is a useful concept in group facilitation. If Victor Turner developed the term for use in cultural anthropology, how did liminoid concepts journey across disciplines into group facilitation? Bjorn Thomassen says that "Any book on liminality must depart from anthropology…" (2014, p. 37) because he is interested in applying liminality to social theory. Thomassen surveys the development of liminal and liminoid concepts in *Liminality and the Modern: Living Through the In-Between*. Thomassen addresses the major developments and critiques of liminality up to current times, bringing additional insight into liminoid concepts. Thomassen also demonstrates the current use of liminoid concepts as a cross-disciplinary lens for the understanding of learning processes. Others adapt liminoid concepts outside of cultural anthropology as well: May (1996) explains the etymological roots between the words "liminal" and "education." Meyer and Land's article *Threshold concepts and Troublesome*

Knowledge: Linkages to Ways of Thinking and Practicing Within the Disciplines (2003) uses threshold (a liminoid related term) concepts to open learners to "troublesome knowledge;" and Meyer *et al.*'s work *Threshold Concepts and Transformational Learning* (2010) allows threshold concepts to be applied to any discipline. These resources demonstrate existing precedent for cross-disciplinary usage of liminoid concepts in other fields beyond cultural anthropology, including education.

This research must at least mention the differences between education and learning despite the scope of such a discussion. Whitworth, Garnett, and Pearson (2012) describe the difference well:

> Education is largely considered a formal approach that shapes learning resources from the top down. Formalised education flows start with an institution that offers accreditation and then provides resources and groupings that meet that expressed goal. On the other hand, learning starts with individuals and communities. The desire to learn, a natural desire, is often constructed as informal learning and comes from individuals or groups with interests who may organize and access resources in pursuit of that interest (2012, p.402).

How does liminoid fit into the categories of education and learning? Educators can teach liminoid as a theory, but liminoid primarily *occurs* during the learning process. Research. Liminal concepts fit into the education paradigm though (Meyer and Land, 2003; Meyer *et al.*, 2010). Meyer and Land described liminal concepts in terms of threshold concepts and troublesome knowledge in education. When a learner encounters a difficult, or troublesome, concept, it challenges their paradigm. Once they comprehend and incorporate this troublesome concept, they pass through a threshold of learning into a new mode of operation. Meyer and Land's research strongly demonstrated how liminality incorporates into education.

Liminoid Theory extended from education into outdoor learning through the “rites of passage” element (Beames, 2004). Rites of passage seemed to be an attractive item to incorporate into outdoor learning pedagogy because it promised a transition from youth to adulthood. Beames cites those such as Bacon (1983), Maddern (1990), May (1996), Venable (1997), Andrews (1999), and Bell (2003) who use “rites of passage” or “liminality” in outdoor learning publications (Beames, 2004). The pioneers of liminality in outdoor learning mainly developed their argument for it through a single aspect of liminality: the rite of passage.

Liminality or liminoid concepts appear less frequently in outdoor learning publications following the boom of rites of passage research cited above. Peter Varley (2011) published work observing liminoid concepts in a sea kayaking group. Polley and Thomas (2017) published work using threshold concepts to emphasize the value that outdoor learning facilitators can offer to the greater educational community for curriculum design and pedagogy (or andragogy). Other than these items, most current outdoor, liminoid research veers into tourism, gender studies, or other disciplines that are related to outdoor education but could be considered a different discipline.

2.3 Appropriate Terminology: Liminal or Liminoid

Some outdoor education scholars have attempted to reconcile *liminality* and outdoor learning. Using liminality puts an inappropriate expectation on outdoor learning that facilitators cannot tenure. This incompatibility comes from the nature of true liminality. Using any sort of outdoor education activity will probably lack the same effects as pre-industrial, ceremonial rites of adulthood. Overarching society does not accept outdoor learning activities as a person's transition to a "full-fledged" member (e.g. adult, father, mother, manager, etc.); instead, outdoor learning opens a liminoid space that allows a person to view the strengths and weaknesses of their society and how that has affected them. For

example, a hike does not make a man a father. Culture dictates that one achieves fatherhood by having a child. Perhaps participating in an outdoor learning event may help that father understand his strengths and weaknesses so that he may be a better father, but it will never make him a father. Outdoor learning activities occur within sub-cultures and offer personal, developmental transitions but not full-fledged socio-cultural rites of passage.

Though not himself an outdoor educator, Thomassen (2014) illustrates connections and differences between liminality and liminoid using a rite of passage and an outdoor activity. Thomassen describes a tribal rite of passage called “gol." Practiced on Pentecost Island, gol happens when young, tribal men jump from a high platform with vines attached to their ankles to save them before they hit the ground. Afterward, they achieve a higher status in their tribal community (2014, p. 510). Precisely that *liminal* rite of passage inspired the *liminoid* activity bungee jumping. Turner himself mentions that liminoid concepts have been mostly relegated to leisure and play activities (1974). This important example illustrates Turner's assertion that liminality connects with the overarching culture, while liminoid phenomena happen in sub-cultural sections of society. Again, no bungee jump moves a person from one recognized cultural position to another. Only a culturally recognized, liminal rite of passage can achieve such a shift in status.

Though a more accurate term, liminoid in outdoor learning research seemingly appears only once. Peter Varley is perhaps the only researcher who applies liminoid concepts in outdoor learning, specifically in paddle sport activities. Varley (2011) correctly describes Turner’s view of the liminoid when he says, “liminoid activities do not occur amongst the central economic and political processes of industrialized societies, but along their margins, interfaces and tacit dimensions” (2011, p.86). This statement demonstrates that liminal is inappropriate terminology when discussing most outdoor learning. The statement does not detract from the importance of liminal concepts generally; instead, it emphasizes the

appropriateness of using liminoid in outdoor learning exercises that employ cultural reflective practice rather than rites of passage.

Beyond Thomassen and Varley's work, further use of liminoid remains unwritten in outdoor learning research. Though liminality has a history in outdoor learning, this research employs liminoid terminology because it sets appropriate expectations for outdoor learning. An outdoor learning activity may often have similarities to the full-fledged liminal rite of passage transitions. However, they rarely, if ever, result in a complete status and position change in society. Therefore, the difference between liminal and liminoid allows outdoor learning facilitators to posture themselves differently. An outdoor group facilitator's role is not to facilitate a rite of passage. Instead, facilitators expose their student groups to the critical mirror that the liminoid space offers as a commentary on the overarching culture. This exchange allows a learner to reflect upon how culture has affected them. Using liminoid instead of liminality allows for a more tenable position upon which to build the rest of the Modulated Liminoid Group Learning Synthesis.

Liminoid Theory may be the correct academic term, but "liminoid" is not a commonly used word in outdoor learning practice. After extensive informal testing and interviewing with teaching assistants and students in my liminoid-focused courses, the two words that individuals most often use to describe liminoid moments in group activities were "stuck" or "stall." This sensation seems to be common for most people. Many have experienced a group where progress grinds to a halt and stalls. In a study of cancer patients in a liminal space, a major theme the patients expressed was boundedness (Little, Jordens, Paul, Montgomery, and Philipson, 1998), which is perhaps a similar term to stall in that it describes "limits to space, available time, and empowerment" (1998, p.1486). In this research, stall will be the term used to express that bounded sensation which occurs in the liminoid space.

To clarify the stall element in practice, personal experience applying Liminoid Theory in practice suggests that individuals and groups experience a stall sensation as they begin to experience the insufficiencies in their paradigms for group interactions. Those paradigms often develop as amalgamated responses to contextual influences and mores. When their paradigm can no longer adequately surmount a challenge, new solutions need postulating and testing to improve the paradigm. In groups, those challenges often centre on cohesion. Examples of group liminoid stalls occur as a group disagrees on a navigation decision, after someone falls while rock climbing and a safety re-evaluation takes place, or during a group disagreement where individuals are not listening and communicating well. Solving these new and uncharted, liminoid problems can further develop the student's ability to work with other individuals in stalls.

If liminality is a practically applicable theory, can outdoor learning critically support an interdisciplinary theory that builds upon liminality like the Modulated Liminoid Group Learning Synthesis? Outdoor learning focuses on learning experiences in the outdoors or the natural environment. Outdoor learning has arguably been around as long as man has existed (Ogilvie, 2013); however, during the past 75 years, outdoor learning developed into a multi-faceted discipline. Outdoor learning can include hard skills that athletes like rock climbers and paddlers perform, but it may also include scientists such as geologists, biologists, psychologists, and social scientists. Simon Priest's *Redefining Outdoor Education: A Matter of Many Relationships* (1986) emphasizes the interdisciplinary nature of outdoor learning. Hickman and Stokes (2015) also illustrate the importance of non-technical skills like decision-making and reflection skills. These non-technical skills can compete for importance against hard skills like paddling or safe ropework. Potter and Dyment (2016) argue for outdoor learning as a distinct discipline. Jeffs and Ord (2018) further illustrate that the cutting edge of outdoor learning uses its interdisciplinary nature to venture into diverse learning

contexts. Outdoor learning is a multi-faceted discipline that can, therefore, incorporate an interdisciplinary theory like the Modulated Liminoid Group Learning Synthesis.

The precedent stands for applying Liminoid Theory beyond cultural anthropology to outdoor learning. Now, this research will address connections in current literature where liminoid concepts could synthesize with three other theories in a novel way. As mentioned in the introduction, the other theories to integrate with Liminoid Theory are Flow Theory, Co-Constructed Developmental Teaching Theory (CDTT), and Group Developmental Stages Theory (GDST). At this point, the literature review will move to discuss how Flow Theory can synthesize with liminoid concepts.

2.4 Flow Theory

In order to discuss connections between Flow Theory and Liminoid Theory, one additional item related to Liminoid Theory comes up: the concept of communitas. Turner (1969) describes communitas as a "modality of social relationship" which gives credit to prominent positions within a society with respect to liminality. The Turnerian idea of communitas, initially offered in his 1969 work, was further developed in 1974. Turner presented three types of communitas: spontaneous communitas, ideological communitas, and normative communitas. The relevant form for this research is spontaneous communitas. Spontaneous communitas is a cohesion that spontaneously occurs amongst a group of people while they are together in a liminal experience. When extrapolated onward to the liminoid, communitas becomes a temporal sense of belonging with others in the same liminoid experience. Varley (2011) illustrates communitas when he demonstrates a connection amongst sea-kayakers who together experience the liminoid space associated with kayaking. Varley's previous work with Crowther (1998) shows how facilitators and their customers fall into culturally narrated roles that form communitas. Communitas is the spontaneous connection people experience in shared liminoid experiences.

In Victor Turner's article *Liminal to liminoid in play, flow, and ritual; An essay in comparative symbology* (1974), he suggests a possible connection between the liminoid and Flow Theory through communitas. As mentioned in the introduction, Csikszentmihalyi (1974, 2008) introduced flow concepts that described the optimal experiences which take place in the human experience.

Turner (1974) connects flow experience with spontaneous communitas here:

"Flow" may induce communitas, and communitas "flow," … Here it is not teamwork in flow that is quintessential, but *"being"* together, with being the operative word, not doing. Csikszentmihalyi has already begun to ransack the inherited cultural past for models or for cultural elements drawn from the debris of past models from which he can construct a new model which will, however falteringly, replicate in words his concrete experience of spontaneous communitas (1974, pp.79-80).

Turner viewed Csikszentmihalyi's work as a restating the liminoid space in new terms and frames. Csikszentmihalyi expressly confirmed that the flow state "…is typically present in the state that Turner (1974) has called *communitas*…" (Csikszentmihalyi, 1975, p.30). This suggested connection leaves room to synthesize both theories by building flow into the liminoid space.

Parsing out the details of Turner's suggestion introduces some nuance. The liminoid space and flow states are actually juxtaposed. The liminoid experience is marked by reflection and perspective shifts because of transition (Thomassen, 2014). Transition, by nature, is not a smooth and focused activity. Conversely, flow states are marked by focused, optimal experience with little reflection due to its instinctual nature. Turner's suggests that communitas can produce flow and that flow can produce communitas. Turner also asserts that communitas forms in the liminoid space. Varley and Crowther (2011) indicate that people who share stories of their own flow from previous experiences can use that narrative

data to develop their roles within a new communitas experience. It seems as though flow and communitas have a cyclic ability to produce each other. Interestingly liminoid spaces seem to be able to hinder flow experiences without hindering communitas. In light of these researchers' discussions, it stands to reason then that in a new group, their own liminoid communitas precedes flow communitas.

If liminoid communitas precedes flow communitas, and Csikszentmihalyi's anti-flow states precede flow, then Csikszentmihalyi's seven anti-flow states might overlap with liminoid communitas space. During the reflective stall in the liminoid space, participants and groups may demonstrate apathy, worry, anxiety, emotional arousal, boredom, relaxation, and control (Csikszentmihalyi, 1975; 2008). Csikszentmihalyi's anti-flow states may offer a possible match for the experience in the liminoid space prior to flow occurring.

For a flow state to occur, eight conditions must take place. The person or group must (1) have a clear sense of goals, (2) receive consistent, immediate feedback, (3) have skills that match the challenge, (4) have attention focused on the task immediately at hand, (5) operate in the moment without being worried about outside circumstances, (6) not worry about loss of control, (7) not worry about others' perceptions of themselves, (8) and must experience time dilation (Csikszentmihalyi, 1975; Csikszentmihalyi and Nakamura, 2014).

When these eight flow conditions are not satisfied, the flow process is interrupted. Csikszentmihalyi conducted a study that showed what happened to people when denied flow experiences. Humans are intrinsically motivated to seek flow in everyday experience. When satisfying flow or micro-flow is not experienced then participants can express feelings of tenseness, infuriation, nervousness, guardedness, irritability, and a whole list of other negative feelings (Csikszentmihalyi, 1975). The most interesting finding was that "most subjects rated 'decreased contact with other people' the worst thing about the experimental condition, followed by the 'act of stopping yourself from doing what you wanted to do'"

(1975, p.172). Even more interestingly, a qualitative narrative study was conducted with cancer patients where the cancer diagnoses induced the liminal state (Little *et al.*, 1998). Two of the three themes shared in the findings of this study demonstrated that patients expressed very similar sentiments. The first was "communicative alienation," which represented "variable alienation from social familiars." The second was "boundedness," which represented "limits to space, available time, and empowerment" (Little *et al.*, 1998, p.1486) These two overlapping narrative themes may demonstrate some overlap between the anti-flow states and the liminoid experience

2.5 Co-Constructed Developmental Teaching Theory

If the liminoid space shares some qualities with anti-flow and flow, how do those two structures relate to experiential learning as described by Co-Constructed Developmental Teaching Theory? Thomassen (2014) asserts that "any discussion of liminality must engage with experience." Non-academically, a writer named Dave Gray (2016) suggests connections between liminoid and experiential learning with a helpful diagram. Gray uses what appears to be an adapted KELT model superimposed over a three-stage model of liminality (2016). Differently, Gray understands the liminoid space as an area of critical thinking and not also a space of external activity or interaction. His work *Liminal Thinking* has no experimental or peer-reviewed interaction to support this claim due to his interests being more leadership driven rather than academic and empirical (D. Gray, personal communication, 1-4 June 2018). Despite Gray's untested, hypothesized diagram, his postulation that experiential learning meant passing through a liminoid space is confirmed by Thomassen's scholarship on the matter. This research plans to test this hypothesized connection between liminoid and experiential learning.

Connections also appear between flow and CDTT. An apparent first connection is that flow is a type of experience, so building a connection between flow and experiential learning

is almost self-evident. Flow is an example of feedback looping between performance and learning (Schenck and Cruickshank, 2015). It may not always be the case that flow is someone's experience in an experiential learning environment, so some exceptions must be made with the understanding that all experiences do not result in flow or even have flow as a part of the loop.

Flow Theory also employs ideas about intrinsic and extrinsic motivation from motivational theory (Csikszentmihalyi, 1975). Through motivational theory, Flow Theory finds links with Self-Determination Theory (SDT; Ryan and Deci, 2000). SDT plays a significant role in the construction of CDTT (Schenck and Cruickshank, 2015). The strongest connection between flow and CDTT happens in the activity step, as mentioned explicitly by Schenck and Cruickshank (2015).

Considering these theorized connections in the literature, liminoid, flow, and experiential learning may connect. Regarding liminoid and CDTT, the Modulated Liminoid Group Learning Synthesis suggests possible alignment between the pre-liminoid space and the framing of CDTT since they are both precursors in nature. The liminoid space would encompass the action phase of an experiential learning loop while the post-liminoid space would include the debrief, pause, bridge-building, and assimilation phases. It could be possible due to the fractal and recirculatory nature of experiential learning loops that debriefs, pauses, bridge-building, and assimilation could also occur within the liminoid space if the action associated with the experience is never completed by the group or individual. These points are where the MLGLS hypothesizes connections between liminoid and experiential learning as communicated in CDTT.

2.6 Group Developmental Stages Theory (GDST)

Group Developmental Stages Theory (GDST) is comprised of the forming, storming, norming, performing, and adjourning stages. How do these stages overlap with liminoid,

flow, and CDTT? The forming stage shares theoretical points with the framing portion of CDTT and pre-liminoid phase. Pre-liminoid was originally described by van Gennep (1960) as separation. This separation occurs when framing a new activity: a group embarks upon a new experience separate from what they experienced previously. Storming has descriptive connectors to the liminoid space (Priest and Gass, 2018). Van Gennep's (1960) original, descriptive terminology for the liminoid space was transition, which can often relate to storm-like experiences. Norming may indicate the beginning of the transition from the liminoid to the post-liminoid, possibly happening upon the transition from extrinsic to intrinsic motivation for participants. Post-liminoid was originally described by van Gennep (1960) as incorporation. Norming, in terms of post-liminoid incorporation, is to be the beginning of re-entry into whatever reality preceded the activity for each participant. Another way to state it would be that it is the beginning of the end of the activity, after which participants will return to their daily lives. Performing has similar theoretical characteristics to flow states (Schenck and Cruickshank, 2015). Adjourning shares the most substantial theoretical overlap with the post-liminoid, incorporation space. GDST describes a process that other theorists have also described due to these overlaps. Unlike liminoid, flow, and CDTT, GDST does not explicitly mention the other theorists in its literature, so the connections arose through conceptual overlap. The similarities seem strong enough to include GDST as the fourth theory to connect in the MLGLS.

2.7 Graphics in Literature Review and Integration

One of the goals of this research was to produce a useful, compact tool for facilitators to use that was dense in theory. A way of accomplishing this effort is through the use of a diagram. The proposed connections developed in this literate review between liminoid, flow, CDTT, and GDST are visually depicted in Table 2.1. The theory name is depicted in column 1. Areas of overlap as discovered during the literature review make up the remainder of the

table. This table is a useful starting point for visually understanding how these theories connect to each other and is also the first formation of the Modulated Group Liminoid Synthesis.

Table 2.1 - Literature Reviewed Areas of Commonality Across Theories

Literature Reviewed Areas of Commonality Across Theories					
Theory	Areas of Commonality				
Liminoid Theory	Pre-Liminoid, Separation	Liminoid, Transition	Liminoid/Post-Liminoid, Transition/ Incorporation	Liminoid/Post-Liminoid, Transition/ Incorporation	Post-Liminoid, Incorporation
Flow Theory		Apathy, Worry, Anxiety, Emotional Arousal, Boredom, Relaxation, Control		Flow	
CDTT	Framing	Activity	Debrief, Bridge-building, Pause, and Assimilation	Debrief, Bridge-building, Pause, and Assimilation	Debrief, Bridge-building, Pause, and Assimilation
GDST	Forming	Storming	Norming	Performing	Adjourning

Developing this table into a robust visual tool that depicts the MLGLS as developed out of the literature review requires a return to the literature. This time, instead of probing for further connections, the review will search for any diagrams which were already used to depict the constituent theories which will make up the MLGLS. Using existing diagrams will aid in preserving the meaning of the original theorists while creating new ones will be done in a way that preserves the theory behind them. Once a diagram is created for each theory, they will then be integrated along the lines of the above table.

Liminoid Theory does not appear to have any visual representation put forward in academic literature. Though a widely used topic, the three stages of the liminoid process are easy to follow. For the purposes of this research, Figure 2.1 has simply been depicted in three stages to be interpreted moving from the left side of the diagram at "pre-liminoid" to the right side of the diagram. This depiction of Liminoid Theory represents the time and space environment where the liminoid process occurs as well as the experiences that participants will undergo in the space.

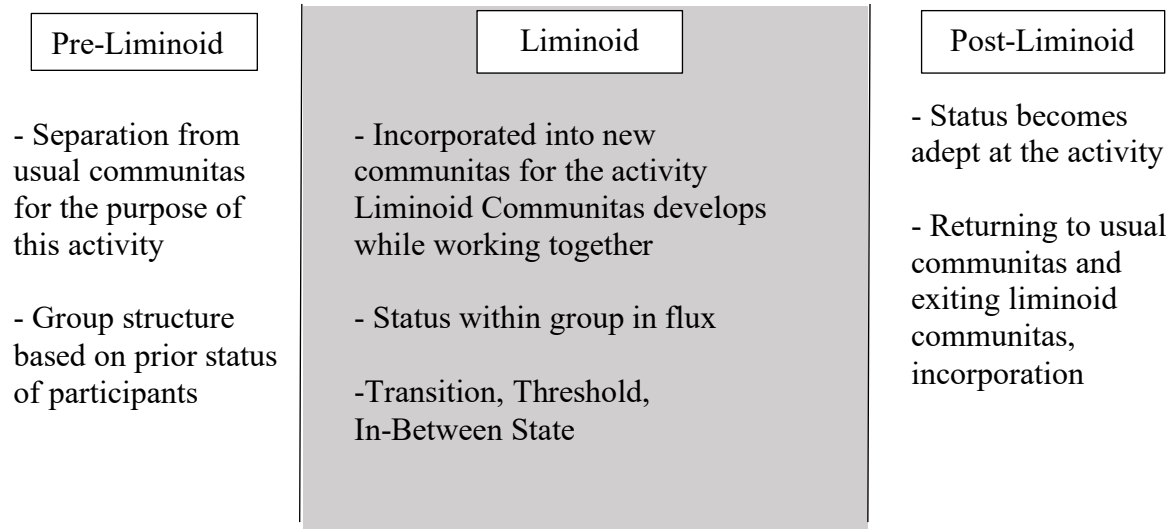


Figure 2.1 - Three Stage Model of Liminoid Progression

The most prolific graphic associated with Flow Theory is a square diagram with an x and y-axis (Fig. 2.2). The x-axis represents a participant or group's skill level, and the y-axis represents the challenge level faced in an experience. Flow always occurs on the exact diagonal where x and y are equal. The graphic shared in this literature review comes from *Finding Flow: The Psychology of Engagement with Everyday Life* (Csikszentmihalyi, 1997) and is based on numerous iterations of development going back to the work of Massimini and Carli in 1988 and Csikszentmihalyi's own pivotal work, *Flow and the Psychology of Optimal Experience* in 1990. This literature review has taken the graphic and rotated it 45 degrees clockwise in order to illustrate a process motion in later connection with the other theories.

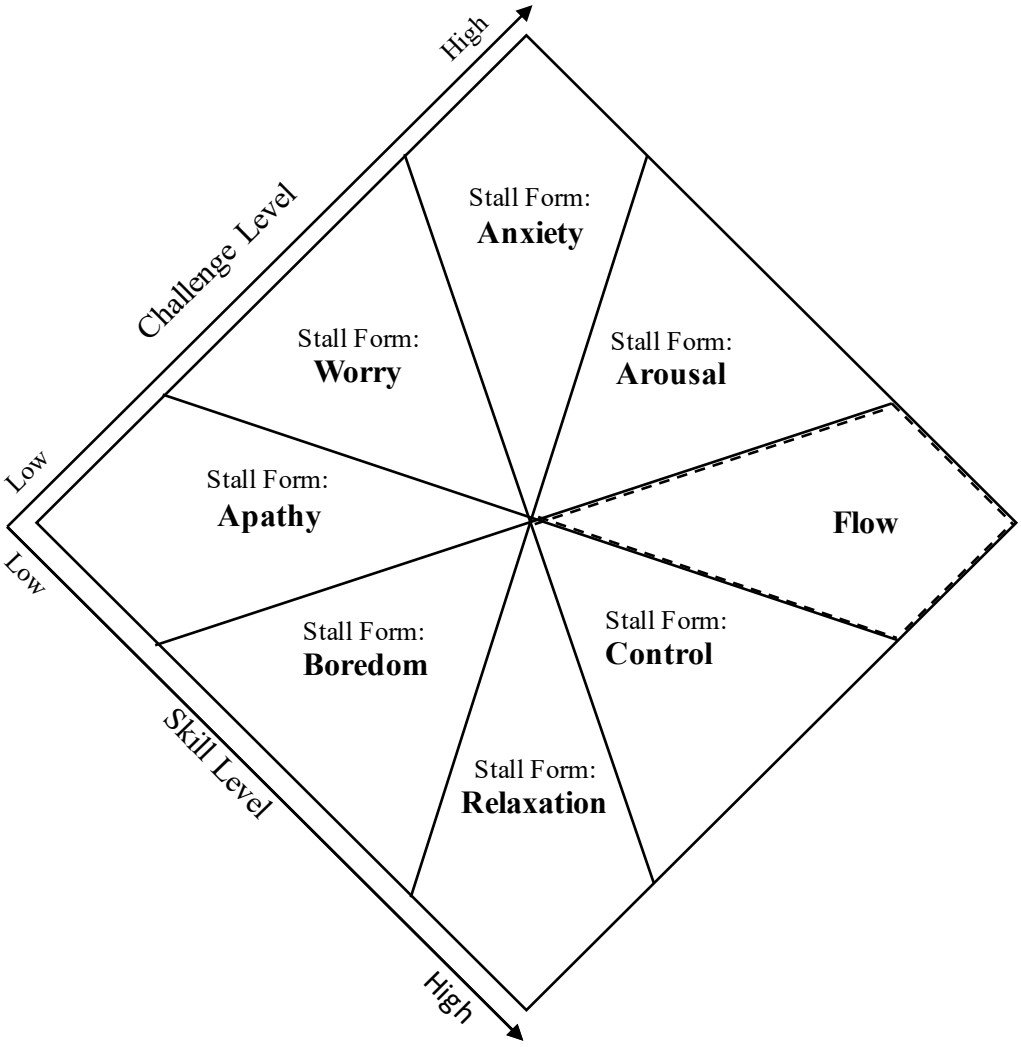


Figure 2.2 - Flow Channels Diagram, Adapted from Massimini and Carli (1988), Rotated 45

Co-Constructed Developmental Teaching theory comes from a long line of theories that have used diagrams to depict the cyclical nature of experiential learning. Kolb's model (Fig. 2.3) first described the cyclic, experiential learning process (1984/2014).

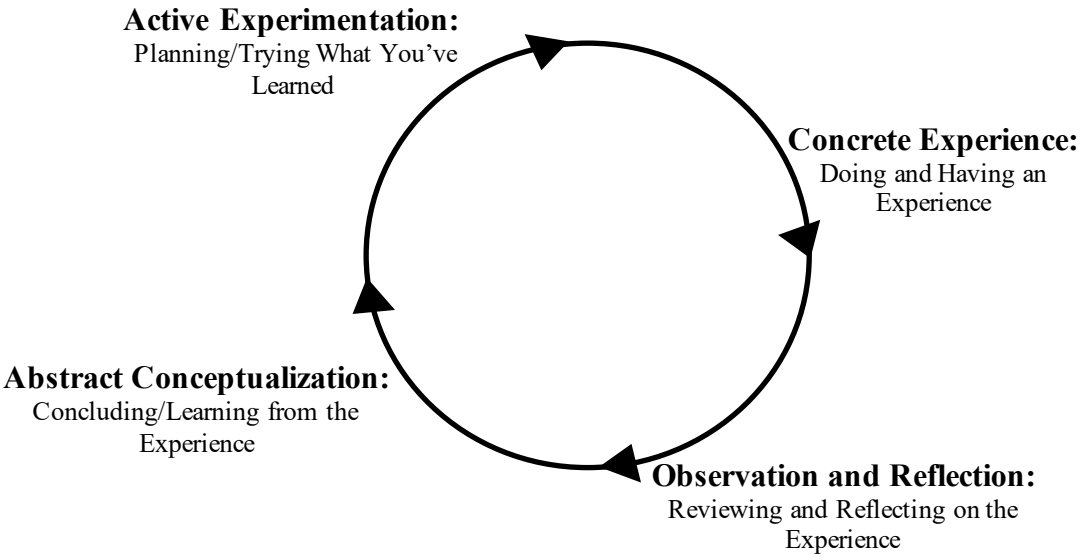


Figure 2.3 - Kolb Experiential Learning Model (1984/2014)

A critique of Kolb's model says that it does not include how construction of belief systems occurs in experiential learning. So, Jarvis (1995) produced a new model of experiential learning (Fig. 2.4) using the Mobius loop as the basis for the diagram. Though slightly more complicated, this diagram does add a level of complexity to the type of knowledge that develops in experiential learning.

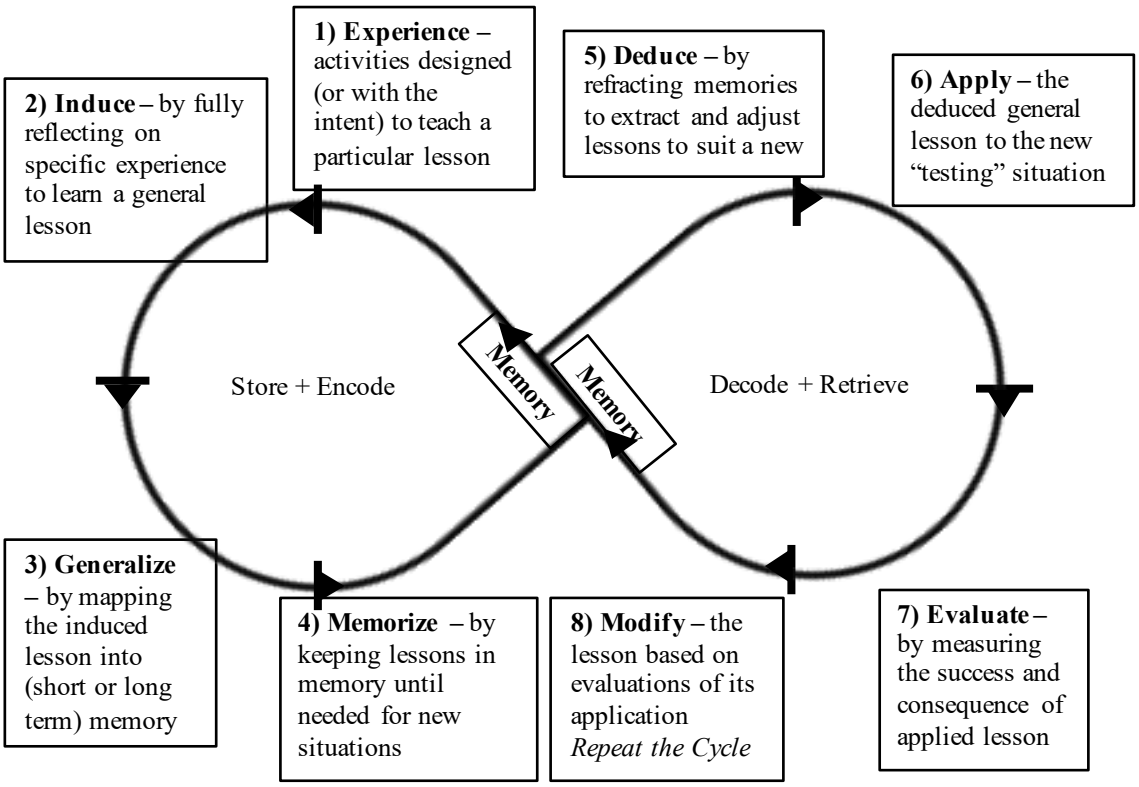


Figure 2.4 - Jarvis Model of Experiential Learning (1995)

Excitingly, Schenck and Cruickshank introduced Co-Constructed Developmental Teaching Theory in 2015 with an accompanying diagram (Fig. 2.5) CDTT continued to allow the development of belief to be incorporated into experiential learning. Schenck and Cruickshank also factored in meditative, mental restorative practice in the "pause" step. A strength of CDTT is that it uses neuroscientific research in its argument. In *Evolving Kolb*, Schenk and Cruickshank communicate the fractal nature of learning cycles. They can repeat in the same activity to produce deeper learning or they can spin off into other areas of a person's life to produce experiential learning in other categories as well.

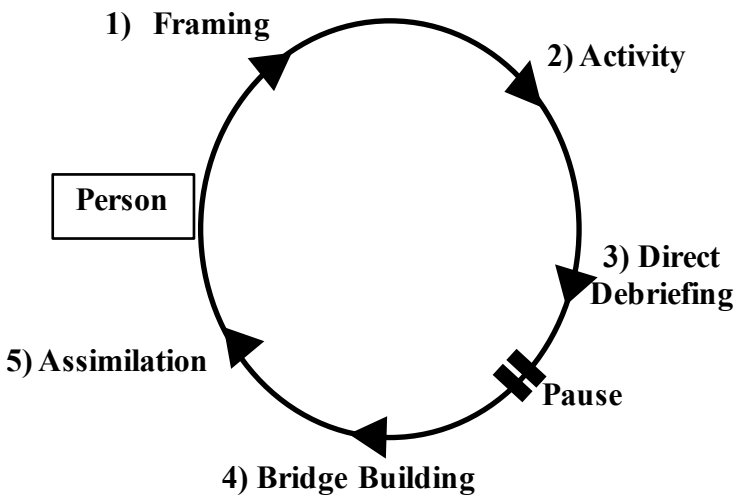


Figure 2.5 - Co-Constructed Developmental Teaching Theory (Schenck and Cruickshank, 2015)

Group Developmental Stages Theory does not have a graphic model in its associated research. This literature review has produced a chart summarising characteristics indicative of the five stages in the task and relationship dimensions. Figure 2.6 is adapted from Tuckman and Jensen's (1977) and Attarian and Priest's (1994) work on the topic.

Group Stage:	Forming	Storming	Norming	Performing	Adjourning
Task Dimension	Acceptance Independence	Resistance Confrontation	Compliance Involvement	Productivity Competence	Termination Separation
Relationship Dimension	Acquaintance Initiation	Rebellion Conflict	Cohesion Intimacy	Pride Commitment	Transformation Satisfaction

Figure 2.6 - Group Developmental Stages Theory with Task and Relationship Dimensions (Attarian and Priest, 1994).

This literature review aimed to synthesize these four theories and their associated diagrams into a single graphic. The guidelines for this were the connections developed in the literature review by using their respective theorist's suggestions. Through several iterations, this diagram most closely represents the synthesis of liminoid, flow, CDTT, and GDST and produces the graphic representation of the hypothesized MLGLS (Figure 2.7).

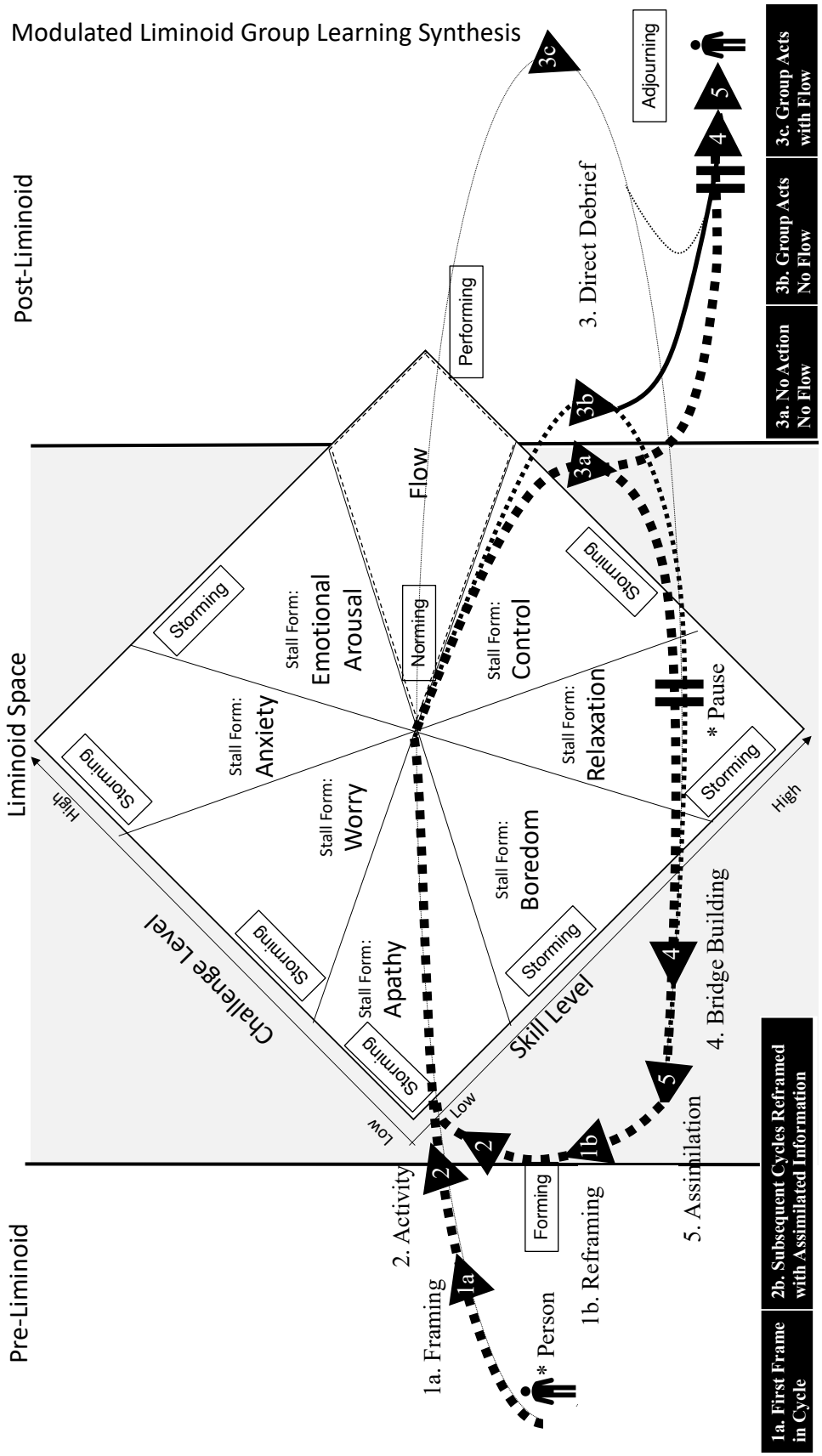


Figure 2.7 - Modulated Liminoid Group Learning Synthesis

The synthesized theories are rendered visually in Figure 2.7. The tripartite pre-liminoid, liminoid, and post-liminoid structure sets the model's background from left to right. In the pre-liminoid space, framing (Item 1a, Fig. 2.7) from CDTT and forming from GDST coincide. The majority of the action happens in the liminoid space. An activity induces the liminoid state for a group (Item 2, Fig.2.7). Storming and anti-flow states take place within the liminoid space. The liminoid space begins to close through the flow channel as norming begins and progresses toward performing. Following CDTT, debrief happens following action(s). Debrief goes on following three types of outcomes (Items 3a, 3b, and 3c in Fig.2.7). Those outcomes are a group that takes no action (3a), they take action that does not lead to flow (3b), or they take action that leads to flow (3c). All three of these outcomes can either recycle back into the liminoid space or exit into post-liminoid. This depiction of multiple possibilities preserves the fractal nature of CDTT described by Schenck and Cruickshank (2015). Whether back in liminoid or entering the post-liminoid, pause, bridge-building (Item 4, Fig. 2.7), and assimilation (Items 5, Fig. 2.7) happen when debriefed experiences are incorporated neurologically into a person's autobiography. If they recycled to the liminoid space, a reframe (Item 1b, Fig. 2.7) taken place instead of a completely new frame (Item 1a, Fig. 2.7). If a group exits the liminoid space, individual learners will apply information assimilated through experience in subsequent related experiences. Exiting the liminoid space does not imply a successful activity outcome, just that the activity is over for the learner. Finally, significant flow experiences and performing are another way to progress from the liminoid to the post-liminoid. In the post-liminoid, adjourning, pause, bridge-building, and assimilation take place once an activity is over. This image summarises the Modulated Liminoid Group Learning Synthesis and its supporting literature.

Figure 2.7 represents a description of the hypothesized explanation of the liminoid space and a group's experiential progression through that space. Where does modulation

come into play for practitioners? In the design of this study, a group divides into two separate teams. One half of the group works together with the full support of their respective facilitator. The other half has the support of their facilitator but must work together unanimously in order to receive help in the activity. If the experience of participants is different between those two halves of a group, then it could suggest that the liminoid space could be expanded or contracted to suit the learning needs of a facilitated group. This hypothesis of modulation is powerful because it would mean that a facilitator could disrupt a flow state from a group for a time by disrupting one of the eight conditions for flow. This would increase the liminoid experience. When the challenge level is finally dropped to be equal to the skill level of the group, they could have a flow experience that could intensify learning. So, the MLGLS is not only a model to help facilitators understand groups, but also one that could adjust the liminoid to produce deeper experiential learning.

2.8 Literature Review Summary

The Modulated Liminoid Group Learning Synthesis produces a literature-review supported integration of liminoid, flow, Co-Constructed Developmental Teaching Theory, and Group Developmental Stages Theory. The theories are not integrated based on the notions of the researcher, but instead upon the suggestions and thematic similarities offered by their respective developers. The purpose of producing the MLGLS is to use it as a succinct summary of a great amount of theory in order to test its influence on the experience of participants in an experimental activity. The hope is that analysing the experience of participants will produce a theoretically dense and critically supported tool useful for group facilitation practitioners.

3. Chapter 3 – Methodology

3.1 Methodology Introduction

This chapter outlines the method choices used for to test the Modulated Liminoid Group Learning Synthesis (MLGLS) in an experiment. This methodology chapter includes an overview of research philosophies, methodologies, and design choices incorporated into this post-test control group experimental design. A description of the data sources used for mixed-methods analysis in this research is also included in this chapter. The chapter closes by discussing the validity, reliability, and trustworthiness of this study. The chapter serves to demonstrate the methods and methodology incorporated into this research.

3.2 Research Philosophy

3.2.1 Post-Positivism

Post-positivism developed from positivism. Positivism grew out of empiricism, which employed the scientific method as the means to measure and interpret reality (O'Leary, 2007). Opponents of positivism argued that all reality could not be perfectly measured because there was always evidence that could refute or falsify a so-called scientific theory or law (Howell, 2013). Karla Henderson (2011) recognizes completely positivist approaches as rarely used in the field of leisure studies (a field close to outdoor learning) because it does not fit with such a practical discipline.

Howell (2013) compares positivism and post-positivism helpfully writing, "

> Positivists consider [that] an external reality exists that can be understood completely whereas post-positivists argue that even though such a reality can be discerned it may only be understood probabilistically" (p.32).

Positivism places importance on theoretical concepts, variables, and observable facts (Charmaz, 2014). Post-positivism maintains this importance and continues to use a reductionistic focus that transforms ideas into small, testable units using variables,

hypotheses, and research questions (Creswell, 2014). Post-positivists focus on understanding causes and how they influence outcomes. Henderson (2011) would agree with Creswell and even uses the post-positivist emphasis on influencers and outcomes to support pragmatist inquiry. Post-positivism is a useful epistemology when truth-seeking because it seeks to hypothesize and test for results while keeping a critical perspective of the researcher's ability to measure reality adequately.

Post-positivist epistemology has influenced this research, as is evidenced in the literature review and methodology. It would be difficult to argue that any research remains uninfluenced by post-positivist thinking. Even qualitative approaches to research standards are affected by post-positivist roots (Guba, 1981; Lincoln and Guba, 1985). Constructs like research questions, hypotheses, and the testing of variables likewise developed from post-positivism. Post-positivist systemic influences also happened in the researcher's academic development. The researcher developed in a deductive, post-positivist worldview, but that expanded because of research effort. To escape influences by post-positivism would be impossible, but it is also unnecessary because a post-positivist aspect offers something to this mixed-method research.

Post-positivism beneficially allows the reduction of ideas into measurable concepts. Were it not for this tenet of post-positivism, the Modulated Liminoid Group Learning Synthesis (MLGLS) could not arise from its four constituent theories. Furthermore, post-positivism supplies the epistemological backing for a quantitative inquiry to be an aspect of this research. It would be difficult to test aspects of MLGLS were in not for post-positivist research structuring. Post-positivism allows numeric measures to represent the observed behaviour of individuals (Creswell, 2014). Post-positivism helpfully allows the use of synthesis, research design, and numerical measurement inherent to significant portions of this study.

3.2.2 INTERPRETIVISM

Max Weber developed interpretivism through hermeneutic and phenomenology disciplines (Chowdhury, 2014).

Interpretivism suits social science research

> … because there is a fundamental difference between the subject matters of the natural and social sciences[.] The methods of the natural sciences cannot be used in the social sciences" (Lewis-Beck *et al.*, 2004, p.509).

Interpretivism is different from positivist and post-positivist inquiry because it "… [aims] to theorize patterns and connections…" "…rather than seeking causality" (Charmaz, 2014, p.230). Interpretivism studies meanings within social worlds (Lewis-Beck *et al.*, 2004). Denzin states that "the focus of interpretive research is on those life experiences that radically alter and shape the meanings persons give to themselves and their life projects" (2001, p.34). Denzin also says that interpretive inquiry uses different, non-numerical data to create accounts of people's experiences. These non-numerical, worded types of data are called narrative data in this research. Gilbert Ryle influenced interpretive thought by introducing "rich description" as an aim for collecting and interpreting narrative data (Ryle, 1971/2009; Ponterotto, 2006). Denzin further illustrates the two aims of interpretive researchers. First, he cites Geertz, Strauss, and Becker as those who offer descriptions of social processes. Second, he points researchers like Ortner and Majchrzak who pragmatically use interpretivism for problem-solving. The overarching focus of interpretivism is to study the social world patterns to make inferences and possibly generate theory.

Criticism of interpretivism centres on data collection issues. One argument suggests that participants are not always aware of their underlying feelings or motivations and require intentional reflection of their experience to produce meaningful data (Lewis-Beck *et al.*, 2004). Another argument against interpretivism is that the interpretation of participant

accounts can demonstrate too much inference. Some say interpretivism can only produce inferences rather than full generalizations (Williams, 2000), though others disagree (Charmaz, 2014). This means that interpretivism can describe something within a social world but could struggle to extrapolate such a description into an application for another context. These critiques of interpretivism show the importance of approaching data by responsibly looking for deeper themes that align with the data.

3.2.3 Constructivism

Constructivism often connects with interpretivism in qualitative research due to some similarities in approach. There are some distinctions between interpretivism and constructivism. Like interpretivism, constructivism maintains that meaning comes from reality. In contrast, constructivism asserts that reality and meaning are constructed internally rather than externally (Given, 2008). With this ontological shift, researcher position shifts too. Constructivist researchers leave behind "… notions of a neutral observer and value-free expert" (Charmaz, 2014, p.13), and their own constructed reality influences their research. Therefore, constructivists believe that a researcher builds meaning within a research project rather than solely interpreting a latent meaning happening in social worlds. A constructivist researcher makes every effort to "…rely as much as possible on the participants' views of the situation being studied" (Creswell, 2014, pp.38-39). Constructivists probe using questions that maintain a broad and open-ended demeanour to gather data through interactions and in social contexts. A critical weakness of constructivism is that it is only able to speak to a specific context without making any generalizations across disciplines (Nola, 1997). The constructivist view beneficially incorporates multiple reality systems and accepts researcher influence.

3.2.4 PRAGMATISM

The roots of pragmatism date back to the end of the 19th century through Charles Sanders Pierce, William James, and John Dewey's scholarship (Given, 2008). Pragmatism developed with the understanding that truth best defined as "what works" (Given, 2008, p.673), with the added nuance that truth always situates in context (Given, 2008; Coghlan and Brydon-Miller, 2014). Criticisms of pragmatism take two primary forms. First, positivist critics argue that ultimate truth situates solely within reality. Pragmatists see truth in processes. The second set of critics against pragmatism view quantitative and qualitative methods as incompatible for concurrent use (Howe, 1988; Johnson and Onwuegbuzie, 2004; Given, 2008). Howe made a striking argument for the compatibility between quantitative and qualitative inquiry in his 1988 article, "Against the Quantitative-Qualitative Incompatibility Thesis or Dogmas Die Hard." This article and subsequent scholarship on pragmatism serve to support the epistemological position of this research. Because the pragmatist's primary goal is producing practical solutions, pragmatists can use multiple epistemological and methodological approaches to identify these solutions (Creswell, 2014). As argued earlier, quantitative and qualitative methods are both acceptable forms of inquiry in the pragmatist view. Philosophical incongruencies are foregone (Johnson and Onwuegbuzie, 2004) or rejected entirely (Howe, 1998) so that truth-finding can occur in context. Finding applicable, contextual truth in order to produce a viable solution to a problem is the guiding principle of pragmatism.

Pragmatism guides this exploratory study because the pragmatic view emphasizes processes and generates viable solutions to problems. Pragmatist inquiry seeks to deliver working solutions to research problems (Coghlan and Brydon-Miller, 2014). Pragmatist solutions arise with immediate, contextual application rather than abstract generalizations (Johnson and Onwuegbuzie, 2004). John Creswell describes "…pragmatism as a worldview

[arising] out of actions, situations, and consequences…" (2014, p.41). Pragmatism emphasizes practicality and situational context; in this research, the context involves group problem-solving activities. Pragmatism also fits with this research because this study aims to explore the outcome benefits of an applied, hypothesized synthesis. The pragmatist worldview maintains that the meaning of a concept comes from that concepts' practical implications (Lewis-Beck *et al.*, 2004). A pragmatic research effort should produce contextualized, applicable findings that have implications for further refinement.

Pragmatism is particularly useful when studying groups because investigating groups produces an array of data types. Pragmatism uses post-positivist, interpretivist, and constructivist views for practical, applicable inquiry. This epistemological diversity allows for methodological diversity, permitting the use of quantitative and qualitative methods for data collection from participating groups. Because pragmatism produces quantitative and qualitative findings and analysis, these two types of analysis can then mix to create a pragmatic analysis.

3.3 Research Methodology

3.3.1 Exploratory Study

Exploratory research takes first steps into a new area of study.

Lisa Given defines exploratory research as

> … broad-ranging, intentional, systematic data collection designed to maximize discovery of generalizations based on description and direct understanding of an area of social or psychological life (2008, p.327).

This study explores how an overarching synthesized theory affects groups. It also explores the validity and reliability of a newly developed questionnaire. These two examples from this study illustrate how "exploratory research is a methodological approach that is primarily concerned with discovery and with generating building theory" (Jupp, 2006, p.110). Jupp

defines exploratory research as flexible, pragmatic, broad, and thorough. Exploratory studies assemble an extensive range of data to produce to report on a new area of inquiry.

3.3.2 Quantitative Methods

Quantitative methods are traditionally associated with positivist and post-positivist research designs (Creswell, 2014) due to post-positivism's reductionist approach to data collection. Conducting quantitative research in the social sciences "involve[s]… counting and measuring those human behaviours which are plausibly quantifiable" (Payne, 2011, p.3). Aliaga and Gunderson's prolific definition of quantitative research is "quantitative research methods [are] the explaining of an issue or phenomenon through gathering data in numerical form and analysing [it] with the aid of mathematical methods; in particular statistics" (Aliaga and Gunderson, 2002; Muijs, 2004, p.1; Apuke, 2017). Quantitative methods focus on taking numerical and statistical measures to conduct a study.

The power of quantitative research is that it allows for a reductionist approach to inquiry. A theory can reduce to a set of questions that measure respondents' answers into manageable numerical data. Numerical data allows for statistical analysis across large sample sizes. Importantly, quantitative research generates findings for generalization across populations (Johnson and Onwuegbuzie, 2004). These strengths make quantitative research a compelling choice when collecting numerical data for analysis in research.

Quantitative methods have shortcomings too. Because quantitative instruments collect numerical data, they fail to capture data that cannot be reduced to numbers (Johnson and Onwuegbuzie, 2004). Additionally, due to the deductive nature of quantitative research, a researcher may test a theory or use survey instruments which do not make sense to a surveyed population: there's a disconnect between theory and contextual application. These weaknesses have ultimately opened the door to qualitative methods.

3.3.3 Qualitative Methods

Qualitative methods work better for researchers with interpretivist and constructivist epistemologies. Qualitative methods include narrative, phenomenology, grounded theory, ethnography, and case study research (Creswell, 2014). Qualitative methods begin analysis with raw data rather than with a theory: this is called induction (Johnson and Onwuegbuzie, 2004). Qualitative, inductive methods allow an investigation into the meaning behind participants' lived experiences. Marshall and Rossman confirm this when they say, "… qualitative research is pragmatic, interpretive, and grounded in the lived experiences of people." (Marshall and Rossman, 2016, p.2). Qualitative methods also study smaller amounts of cases in-depth (Johnson and Onwuegbuzie, 2004) rather than looking into a large sample size with only a numerical, statistical procedure. Being able to study non-numerical data, in-depth, and inductively are three strengths to qualitative research. Weaknesses of qualitative research happen because of the type of conclusions it produces. Because qualitative analysis is so rooted in the context of an activity, it can be difficult to elevate its results to generalizable theory (Johnson and Onwuegbuzie, 2004). Developing generalized theory still happens in qualitative research (Charmaz, 2014), but perhaps less so than in quantitative inquiry.

3.3.4 Convergent Parallel Mixed-Methods

A mixed-methods research design supported by pragmatist philosophy employs multiple methods to answer the research question (Creswell, 2014). In like manner to its pragmatic background, mixed-methods research operates in light of traditional disagreement between quantitative and qualitative design (Sieber, 1973; Johnson and Onwuegbuzie, 2004). Despite these disagreements, some pioneered their integration (Campbell and Fiske, 1959; Sieber, 1973; Creswell, 2014); and others now argue that quantitative and qualitative methods are not incompatible at all (Howe, 1988; Johnson and Onwuegbuzie, 2004). This

research aims to explore the experiences of participants in a modulated liminoid group learning activity. A pragmatic, mixed-methods study could explore such an activity by collecting a broad spectrum of quantitative and qualitative data for an integrated analysis.

The parallel component of this mixed-methods research strategy articulates the timing of mixed data collection. Qualitative and quantitative data is collected concurrently (Johnson and Onwuegbuzie, 2004; Creswell, 2014). The convergent aspect refers to the analyzation technique—quantitative and qualitative data inform each other in interpretation following the study (Creswell, 2014).

This study makes pragmatic use of both quantitative and qualitative methods to develop broad ideas about the researched population's experience in the activity. Quantitative analysis allows for generalizations and a larger investigated sample. Qualitative analysis allows deeper investigation into a portion of the sample. This mixed-method approach should therefore produce a robust look into the experience of participants who participate in a modulated liminoid group learning activity.

3.4 Research Design

3.4.1 Experimental Design

This convergent parallel mixed-methods study explores how the Modulated Liminoid Group Learning Synthesis might impact a facilitated group of participants. A post-test only control group experimental design was selected (Crowe and Sheppard, 2012) because it allows participants to have an experience and share their resulting reflections through instruments and debriefs after the study. Pre-test survey instruments offered before the activity could influence participant performance in the activity itself. The experimental design also uses control and experimental group division to explore the modulation aspect of MLGLS. Modulation implies a controlled change in activity difficulty for the experimental group. An element of unanimous decision making is introduced to the experimental side of

the activity to introduce this modulated aspect. For these reasons, the post-test only experimental design seems best-fit for this research.

3.3.2 Sampling Method

This research design chose convenience sampling to contact 24 possible participant groups. Organizational gatekeepers of potential samples were contacted ahead of time via e-mail to request permission to conduct research. This procedure allowed gatekeepers to recruit volunteers from their respective organizations to participate. The email correspondence asked gatekeepers to recruit a large group of at least 14 participants. This number represented the best estimate for conducting two side-by-side Traffic Jam activities. Rohnke did not specify size requirements for Traffic Jam (Rohnke, 2009), but this research assumed a smaller group size might decrease the challenge of the activity. Twelve groups agreed to participate in the study between November 2018 and November 2019. In these 12 groups, 171 participants (n=169) and gatekeepers (n=2) agreed to participate in the study in a documented format, 24 of the 171 agreed to facilitate.

The convenience sampling method was the only viable method for recruiting participants. This investigation used convenience sampling because groups of the size mentioned above were difficult to access without relying upon the network of the research (Lewis-Beck *et al.*, 2004). While convenience sampling allowed for pragmatic sampling to take place, it opened the possibility that this sampling method could skew the demographic of the research. A contextual bias from the researcher's sampling choices could develop as a result of convenience sampling.

The researcher is from the South-eastern United States and associated with religious groups and universities. Steps taken to mitigate this contextual bias included making calls for participants groups in non-university groups, non-religious groups, and groups of differing cultures. The sample successfully recruited populations in the North-western United

Kingdom, the South-eastern United States, and Hong Kong. Sampling in three different cultural contexts would mitigate some cultural bias. Sample population groups volunteered from non-academic and non-religious backgrounds as well. These measures should help to reduce bias that comes through convenience sampling.

3.4.2 Sample Size

Determining the appropriate sample size for conducting a mixed-methods study posed challenges because of varying guidance in academic literature. Initially, this research aimed to collect 385 respondents because that number appeared in a scholarly resource (Daniel, 2012). Upon further investigation, this number appeared as if produced somewhat arbitrarily. The sample size needs to result from deeper considerations. Andy Field argues that one should calculate the sample size from a combination of the power of a test and the desired level of significance (Field, 2018). While Field's point had merit, the most helpful explanation came in light of the statistical analysis method used in this research: a confirmatory factor analysis. Three researchers produced computerized models to determine sample size using a function of the number of factors and the number of variables in a study (Mundfrom, Shaw, and Ke, 2005). As a result of their research and another study into sample size for conducing structural equation modelling (Marcoulides and Saunders, 2006) this study requires at least 100 respondents to achieve enough statistical power to conduct a confirmatory factor analysis with 11 variables and four factors. After factoring in non-response data, there were 137 viable responses to use for factor analysis. This amount of participants would allow wide factor commonality scores between .2 and .8 while continuing to indicate that the sample was large enough for a good level criterion of fit (K=.092) to the population.

Qualitative sampling size required different parameters. Qualitative studies do not use statistical power, but instead develop rich descriptions (Ryle, 1971/2009; Ponterotto, 2006) of

an observed individual or group so as to represent that group in a trustworthy manner. Qualitative sampling in this study involved selecting the groups which produced the greatest amount of qualitative data through questionnaire and debriefed responses. This research picked a group from each country that used the above criteria. A thorough qualitative analysis could happen by sampling three data-rich groups from different cultural contexts.

3.4.3 Activity and Intervention Design

In this post-test-only control group experiment, a group would meet at a location associated with their organization. For example, the university groups who participated met in university classrooms. Once the group arrived on site, they completed a consent form and a demographic intake survey form. The demographic intake survey identified participants who might volunteer to facilitate during the experiment. This voluntary leadership style imitates the style of leadership usually taking place in outdoor learning environments. On the demographic intake survey, all participants indicated whether they would volunteer to lead a group. Additionally, a multiple-choice scale question asked for their experience level at leading groups. At least two facilitators volunteered within each group as a result of this demographic survey.

While the method for choosing the facilitator is not random, the facilitator is not a sampled member of the experiment or control group in terms of the follow-up questionnaire. They are not a source of questionnaire data. Non-random selection of facilitators would need defence if the research asked facilitators to complete surveys. The research design randomized whether a facilitator led the control or experimental group. The facilitator selection process also protected against disparity amongst facilitator experience levels by choosing two of the volunteer facilitators who had the most similar levels of experience of leading groups. These measures allowed for similarly experienced, volunteer facilitators to lead during every group in the experiment.

3.4.4 Researcher Role During Experiment

This is an excellent point in the explanation of the experiment to develop the researcher position. My positioning decisions as a researcher in this experiment intended to keep the natural and organic nature of each group intact without offering my experienced influence. As mentioned in the introduction, I have five years of experience of facilitating modulated liminoid group learning activities. If I participated in these groups, I would skew the results against the other half of the experiment. Furthermore, my involvement may produce a less natural response from participants because I am not a part of their organization. They could be less comfortable with me. I wanted these groups to be natural, group dynamics activities that could conceivably take place in any organizational group dynamics scenario.

Another reason I remained outside of a participatory role as the researcher was to elevate a variable that exists in any group activity: facilitator influence. All facilitators come from a variety of different backgrounds in education, culture, personality, and facilitation experience. To remove the fingerprints of the diverse types of facilitators out of the groups in the activity would again decrease the "true to life" nature I designed into this experiment. Above all else, I wanted these activities to have been possible were I not in the room, and I often was not as I had to float back and forth when the groups divided into separate rooms. I think this positioning decision made the groups in my experiment more reflective of what a "real world" group might look like problem-solving in an initiative activity.

3.4.5 Training Video

Once two facilitators volunteered to lead a Traffic Jam, the researcher separated them from the rest of the group. The two facilitators then watched two different training videos in two separate rooms. The control group facilitator's training video was 10 minutes long. His or her training video included a step-by-step explanation of Traffic Jam (Rohnke, 2009) that the

researcher pre-recorded. The video explanation of Traffic Jam shared the rules for setting up the activity, the two legal moves in Traffic Jam, and the three illegal moves. The video included conditions for resetting the activity and also communicated what constituted a success scenario. The control group facilitator's video also urged them to be very supportive of their participants and to offer three hints to help the group. The hints were helpful strategies that might help the group discover the solution, but in no way directly lead the group to the solution.

The experimental group facilitator's training video included the same explanation of Traffic Jam as the control group facilitator's to preserve similarity between the control group and the experimental groups' activities. The experimental group facilitator's training video had two important differences. The first difference is that the experimental group facilitator received instruction to give hints only if the group unanimously requested them. The facilitator received further instruction to communicate that hints were available upon unanimous request. Each of the three hints required a separate unanimous vote. Unanimity is the most important modulated difference between the control and experimental groups. Importantly, neither the hints nor unanimity were necessary to solve the activity.

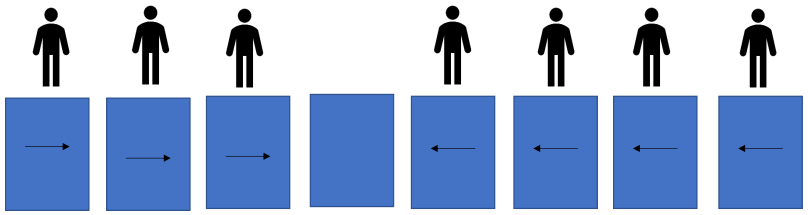
The second difference in the experimental group facilitator's training video is that it included an extremely brief overview of liminoid, flow, CDTT, and GDST in a theory section. The section explaining the four theories makes up three minutes and 25 seconds of the 15-minute-long training video. However, it is still an extremely brief explanation of the four theories that comprise Modulated Liminoid Group Learning Synthesis.

Once both facilitators have watched their training videos, they were given a "quick reference guide." The quick reference guide summarized the details in from video on a two-sided sheet of A4 paper. The experimental group facilitator's quick reference guide was slightly different because it reflected the differences in their training video.

3.4.6 Traffic Jam Activity Explanation

While participants waited on the facilitators to watch the training videos, introductions, discussion, and random assignment to control and experimental groups took place. Any conversation before the activity never included Traffic Jam or MLGLS. The control group and experimental group then moved to separate rooms for the Traffic Jam activity. Their corresponding facilitator would join them once finished watching the explanation video. All this means that if there were 14 participants recruited for the activity, two would become facilitators, six would be in the control group, and six would be in the experimental group.

Traffic Jam itself is a group dynamics initiative developed by Karl Rohnke (2009). Setup involves dividing a group in half and having them stand in a line on blue squares facing one another (Fig. 3.1). So, if a control group of seven is divided in half, there would be two groups of people facing each other standing on blue squares: three on one side four on the other. It does not matter which side has the group of four or the group of three. Importantly, one empty blue square is always left between each side in the line to begin. Their task is switching places positionally using a set of rules. Traffic Jam is deceptively tricky. This dissertation includes illustrations of the explanation of Traffic Jam for clarity.



- Blue square icons are spaces where participants stand.
- Arrow represent the direction they're facing.
- The person icon represents a person standing on a space.
- A space with no person above it is empty.

Figure 3.1 - Traffic Jam Starting Positions

When a participant group met with their facilitator, they were provided with some blue squares printed on A4 paper equal to one more than the number of participants in their

half of the experiment (not counting the facilitator). So, if there were six people in the group, seven squares were provided. These squares laid on the floor in a straight line to set the stage for the activity. In the diagrams below, blue squares represent those squares on the floor. The person icon above the blue square in these diagrams indicates a person standing on that square. The arrow imposed on top of the square indicates the direction the person standing on that square is facing. A square with no arrow or person is empty. The middle square always starts empty. If an odd number of people are participating, it does not matter if the left or right centre square is the empty one.

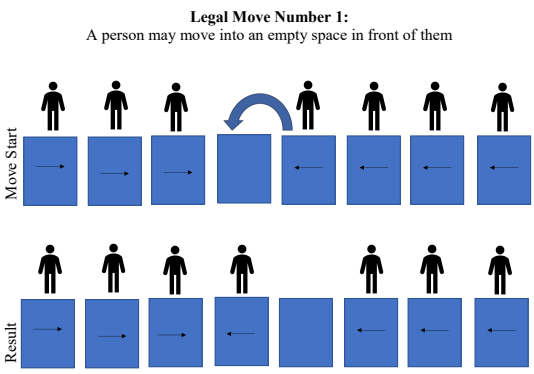


Figure 3.3 - Legal Move Number 1

Next, Traffic Jam permits two types of legal moves (Fig. 3.2 and Fig. 3.3) to progress toward success. Legal move one states that a person may move into an empty space directly in front of them (Fig. 3.2). Legal move two states that a person may move around another person who is facing them into an empty space behind that other person (Fig. 3.3). Legal moves one and two are depicted in the graphics below. These are the only moves allowed in the initiative.

In Traffic Jam there are three illegal moves. Illegal move one states that no moves backward are allowed (Fig. 3.4). A participant cannot take a step into an empty space behind them. Illegal move two happens if a participant moves around someone facing the same direction as another participant (Fig. 3.5).

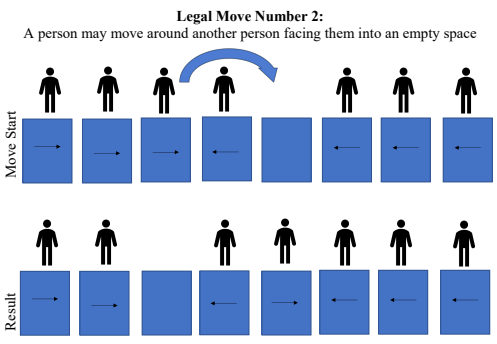


Figure 3.2 - Legal Move Number 2

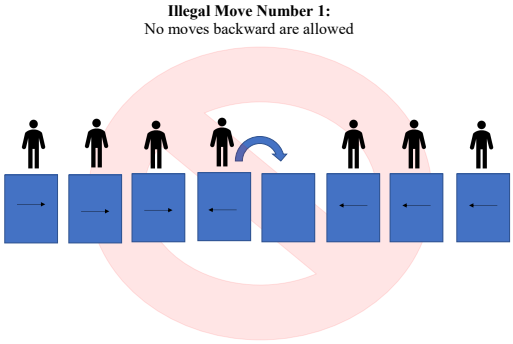


Figure 3.4 - Illegal Move Number 1

Notice this is different from legal move two, where a participant can move around another participant into an empty space because that other participant is facing the opposite direction. Illegal move three prohibits two participants from moving simultaneously (Fig. 3.6).

Finally, Traffic Jam has a success outcome and a failure outcome. The success outcome occurs (Fig. 3.7) when all participants have switched sides by following the legal moves and not making any illegal moves. A reset (Fig. 3.8) happens when the group can make no more legal moves. A reset means that participants must return to their starting positions. The diagrams below depict both success and reset outcomes.

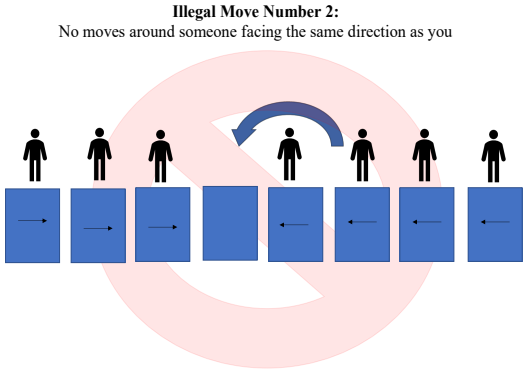


Figure 3.6 - Illegal Move Number 2

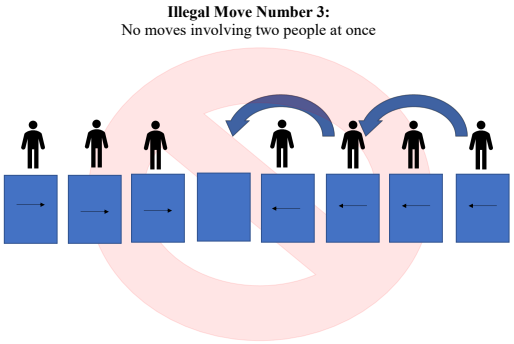


Figure 3.5 - Illegal Move Number 3

The training video mentions three hints for the facilitators which they could share according to their roles. The control group facilitator could share the hints at any time,

while the experimental group facilitator required a unanimous agreement to share each hint. In the event that a group discovered a hint on their own, the experimental facilitator confirmed that only when the group unanimously asked for another hint. Hint number one suggested that someone step out of the line of squares to offer a different perspective to the group. Hint two suggested the group construct a model of the activity and solve it on a smaller scale. Hint three suggested that the group select a leader to direct participants. These hints were designed to give helpful perspectives without giving away the answer to the activity.

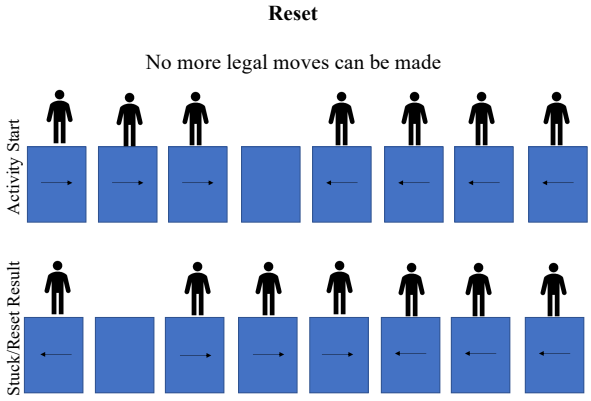


Figure 3.7 - Traffic Jam Reset Scenario Example

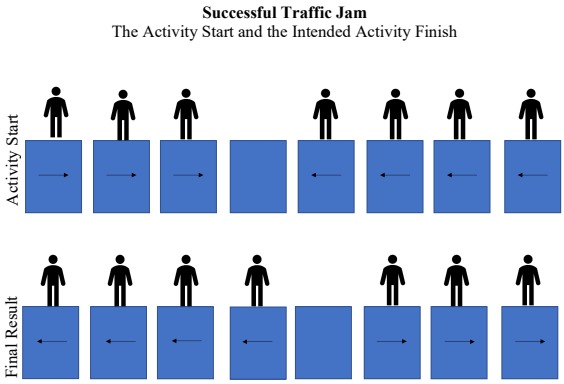


Figure 3.8 - Successful Outcome of Traffic Jam

3.4.7 Pilot Studies

Three iterations of piloting improved this research effort. The first two pilot measures related to the questionnaire. In September 2018, five colleagues reviewed the questionnaire. These colleagues had experience with the modulated liminoid group learning synthesis. This first pilot measure clarified wordy and confusing questions. More importantly, these practitioners ably identified some of the theories behind the questionnaire items. Their recognition of theory-backed items suggested some item clarity. Clarifying edits occurred with items that seemed too wordy or theoretically ambiguous.

Second, this project used the questionnaire as a post-test measure with undergraduate students in the United States who participated in the traffic jam initiative without control or experimental groups. This pilot was conducted remotely with a faculty member at the university who is an expert practitioner in modulated limonoid group synthesis. Unfortunately, this measure yielded little for modifying the questionnaire because feedback was unavailable from those who underwent the trial.

A third trial happened with undergraduate university students in the United Kingdom to gather feedback on the questionnaire itself. The researcher carried out the full experiment. Participants completed the questionnaire immediately. Following the completion of the questionnaires, the participating students offered feedback on the questions. This pilot study led to helpful feedback for the questionnaire.

3.4.8 Data Sources

3.4.8.1 Activity Video

Data came from a variety of sources throughout the experiment. First, the experiment practiced video recording using high definition cameras. Cameras recorded videos of both control and experiment sides of each participant group. Of the 12 groups sampled, cameras successfully recorded 21 videos. Challenges that disallowed some video recordings included a lost digital video file and foregone video recording due to ethical considerations of a sample group.

3.4.8.2 Debrief Conversations

The next type of data collected came through debriefs. Debrief conversations ranged from informal post-activity talk to video-recorded guided debrief. Challenges to collecting debriefing data were twofold. First, some of the debriefing conversations that took place happened so informally that it was difficult to capture. Second, the researcher did not always

receive an invitation to conduct a guided debrief after the activity, or it was inappropriate for the group. Nevertheless, recorded debriefs occurred with eight out of the 12 groups.

3.4.8.3 Questionnaire

The questionnaire was a follow-up measure offered immediately after the Traffic Jam activity and after any informal or formal debriefing took place. While it would have been ideal to receive completed questionnaires before debriefing, that appeared not possible in practice for two reasons. First, the time it took to thoughtfully complete the 45-item questionnaire sometimes caused participants or gatekeepers to request to complete the questionnaire following the experiment session at a more convenient time. The debrief proceeded instead. Second, it was impossible to stop the inter-participant informal debrief process. Participants naturally wanted to discuss their experience during and following the Traffic Jam activity.

The questionnaire set out to collect two types of data after the debrief. While Creswell (2014) says that quantitative research in the social sciences often employs survey research, it is permissible to collect qualitative data from survey items as well. In this case, 36 items on the questionnaire presented scale questions with a response ranging from 1-9. The other nine items were open-ended response questions that asked for a qualitative elaboration upon a prior, scale question.

3.4.8.4 Questionnaire Design

Quantitative research in the social sciences often employs survey research (Creswell, 2014) to collect quantifiable response data from participants. This research effort developed a survey (Appendix C) to measure the Modulated Liminoid Group Learning Synthesis's effect on participant groups. The questionnaire for this research project transformed tenets of the four MLGLS theories into questions.

This step followed Lavrakas' (2008) guidance, which says,

> A list of concepts of interest and how they relate to one another aids in selecting specific questions to include. These concepts are transformed into (i.e., operationalize as) survey questions that measure the concept in some way, proceeding from abstract concepts to [specific] measurements" (p.656).

Lavrakas stresses the importance of conceptual underpinning to each questionnaire. Taking this advice, the 36 scale questions included in this questionnaire used the theoretical points inherent to each theory for questionnaire items. If theory drives the research question, theory should develop the tool to test the research question. Use of low-inference (Drew, Hardman, and Hosp, 2008), thoughtfully-ordered, clearly-formatted, and simply worded (Lavrakas, 2008) quantitative scales and open-ended qualitative questions guided the questionnaire design process. Where possible, pre-existing questionnaires associated with the MLGSL's constituent theories were adapted for inclusion into this questionnaire. A questionnaire already existed to test Flow Theory (Massimini and Carli, 1988), so it was used with minimal adjustments. For the other three theories, questions were designed in correspondence with each theory. These approached helped create the questionnaire used to test the experience of participants in modulated liminoid group learning activity.

Beyond the 36 quantitative seven-point scale questions in the questionnaire, there are nine qualitative questions. These nine questions always ask for open-ended elaboration on a preceding questionnaire item. For example, question 29 is a scale question that asks, "Rate the degree to which you agree or disagree with the following statement: At some point during the activity, our group progress stalled." Question 30 follows, asking, "If you're able, please write what happened in your group that made it clear you were stalling." It is clear how these qualitative questions demonstrate deductive loading, but they intend to test the responses of participants to the theories that comprise modulate liminoid group learning synthesis.

3.4.8.5 Three Week Follow-Up Email

Participants agreed to receive an email up to three weeks following their participation in the Traffic Jam activity. This measure was designed into the experiment to explore whether participants experience any longer-term reflection following the activity. The email used a single question: "Have you thought at all about the group activity experiment you took part in on [date]? If so, what reflections did you make or thoughts did you have? If not, please leave me a line saying so." This question intended to be very broad and open-ended for participants to feel as though they could share any thoughts or reflections following the Traffic Jam activity.

3.4.8.6 Researcher Journal

The final data produced in this study came from the researcher. The researcher kept a reflexive journal to record thoughts and reflections following each Traffic Jam initiative conducted for the experiment. The researcher recorded reflections following each activity, and he added to this journal upon review of video records. The narrative data contained in this journal offered interpretational insight for the analysis in this study.

3.5 Analysis Strategies

3.5.1 Quantitative Analysis Strategy

3.5.1.1 Exploratory and Confirmatory Factor Analysis

Use of a new questionnaire is often necessary for exploratory study; however, research designs that use new questionnaires must demonstrate the questionnaire's reliability and validity. One way of accomplishing this is to subject the results of the questionnaire to factor analysis. Exploratory factor analysis (EFA) first discovers the latent variables behind a set of measured variables. Subsequently, confirmatory factor analysis (CFA) allows conformational testing of factors discovered through EFA (Vogt, 2005). If the questions from the survey represent variables, EFA helps group them according to an underlying "latent"

variable. Neil Salkind (2007) suggests that EFA "… is undertaken when the researcher has no strong a priori theories about the number and nature of underlying factors" (p.332). While the questionnaire was developed with the intention to measure four theories, whether the questions in the design were actually collecting data to test those theories in the latent variables remained unknown. EFA addresses that issue. Another advantage of EFA is that it identifies the strength of connections between variables. Weakly connected variables represent weak questions on the questionnaire to be removed. EFA illustrates the latent variables as well as variables the researcher should remove from the questionnaire.

Confirmatory factor analysis confirms the hypothesized latent factors developed through exploratory factor analysis (Vogt, 2005). CFA allows confirmation of the measurement tools behind confirmed variables (Lewis-Beck *et al.*, 2004). Additionally, variables not confirmed through CFA can be removed. CFA also permits the development of a visual model that depicts the latent factors and their influencing variables. This visual model begins as a set of hypotheses formed through EFA. Further refinement happens through an evaluative method that factors in associations between variables and latent variables. The visual model depicts a diagram of paths which represent correlations and circles which represent variables.

3.5.1.2 Structural Equation Modelling

Structural equation modelling (SEM) is a methodology that "…seeks to represent hypotheses about the means, variances, and covariances of observed data in terms of a smaller number of "structural" parameters defined by a hypothesized underlying conceptual or theoretical model" (Lewis-Beck *et al.*, 2004, p.1088). The model is somewhat visually similar to confirmatory factor analysis in that is uses lines to represent paths of correlation between circles which represent latent variables. SEM renders only connections between latent variables, so the questionnaire variables themselves are removed when viewing a

model developed through SEM. The value of CFA is that it shows correlations between variables and latent variables; SEM shows the influence of independent variables upon latent variables and latent variables upon each other. Structural equation modelling as used in this study produced a model that showed latent factor interaction based upon the statistical data collected with the questionnaire.

3.5.2 Qualitative Analysis Strategy

3.5.2.1 Narrative Case Study

Qualitative inquiry explores worded data shared by participants. Worded data is called narrative data in this research. After gathering narrative data through researcher reflections, open-ended questionnaire responses, transcriptions of video recorded debriefs, and follow-up emails, a decision needs to be made about how to analyse that data. Choosing the correct method of analysing narrative data is important because it helps to best reflect the experiences of participants during the experiment. A narrative case study could serve as a methodological means of interpreting the narrative data resulting from this experiment. Brandell and Varkas (2001) describe a narrative case study as

> … the intensive examination of an individual unit… It also can be argued that a defining characteristic of the case study in social work is its focus on environmental context… Case studies are held to be idiographic (which means that the unit of study is the single unit) (p.377).

From this definition, choosing a particular unit could be possible within the research design: a group. Studying a single participant in the context of this designed experiment would ignore data available from other participants, so that approach should be ruled out. Studying the entire experimented group as one narrative case study could reveal common themes in their reported narrative data. The caution to remember that narrative case study rests within the

context of the Traffic Jam initiative as completed in this experiment. Generalizing beyond that context should be done tentatively.

Having considered four of the five types of qualitative research methods as outlined by Crowe and Lorraine (2012), one emerges to most closely match the data to be collected within this designed research. Narrative analysis, ethnography, grounded theory, and phenomenology were shown in this section not to be the best fit. The narrative case study method seems the ideal qualitative research method for this experiment since it allows exploration of the experience of a group of participants.

3.5.2.2 Deductive-Inductive-Deductive Reasoning Method

The narrative case study analysis intends to use a method of stepwise deductive-inductive-deductive reasoning to approach the narrative data produced in the experiment. A deductive-inductive-deductive is not a classic approach, but to call this research as such seems most appropriate.

First, deduction takes place when inferences from premises or hypotheses upon a research design (Given, 2008). This research and the instrumentation used in it is front-loaded with a deductive approach: theory directly influenced the design of this research. Deductive inferences made in the research design will inevitably affect the activity and resulting narrative data from participants. Answering an open-ended survey question written through theoretical frames will inevitably produce responses in light of that theory. While a valid concern, this design does not necessarily depart from a natural, facilitated group dynamics activity. Many facilitated activities are contrived and contain a learning outcome or principle (theory) taught in the activity.

While deduction has influenced this study significantly, this research maintains a commitment to analysing narrative data produced in a case study inductively. This end will happen by coding narrative data produced by respondents in open-ended questionnaire

responses, transcriptions of video recorded activities, and responses. Coding is the process of sorting and labelling narrative data (O'Reilly, 2009) through a close inspection (Charmaz, 2014). This research used NVivo 12 as a digital means for coding narrative data produced in a case. From those codes, themes developed by classifying codes together by criteria using similar meaning (Mills, Durepos, and Wiebe, 2010; Charmaz, 2014). The purposes of conducting thematic analysis are: seeing within the data, finding relationships within it, conducting analysis upon it, treating it systematically, and making quantitative analysis if necessary (Boyatzis, 1998; Mills *et al.*, 2010). The themes that emerge will suggest shared experiences that occurred within the case group studied in the analysis.

So, in a deductive-inductive-deductive method, there are deductive influences built into the research design. However, an inductive approach to the narrative data allows for the discovery of shared themes within the case study group. The themes that come up may be completely emergent; however, some of the codes and themes emergent in the inductive study may result from deductive influence. In that case, these themes would render as deductive in the findings section. This choice reflects deductive influence on the design of the study.

3.5.3 Mixed-Methods Analysis Strategy

After processing the quantitative data into a structural equation model and the qualitative narrative of three case groups into themes, how will these two products mix in the analysis? For this convergent parallel mixed-methods study, quantitative and qualitative findings must mix in the interpretation. This mixing of methods must include examples of times the two products confirm and contradict each other (Creswell, 2014). Meta-inference interpretation will compare, contrast, and refine inferences independently generated by the quantitative and qualitative aspects of the study (Creamer, 2018). It is important to note that meta-inference is an inference strategy that seeks to move beyond mixed descriptions in order

to make inferred generalizations about the results of the study. Creamer also emphasizes interpretive transparency, which illustrates connections between data and inference through researcher reflexivity (2018). At times, the researcher may speak in first or third person to communicate personal thoughts of conflict, confusion, and personal learning throughout this research: these are examples of reflexivity. Finally, this research will use meta-inference (Creswell, 2014) mixed analysis as the method for transparently interpreting quantitative and qualitative results generated through this study. Mixed-methods meta-inference describes the final blending process where quantitative and qualitative findings are merged together to produce the conclusions of this study.

3.6 Research Standards

Research design withstanding, the discussion turns to research standards. When approaching research from a mixed-methods standpoint, various terms need mention. Standards for conducting quantitative research generally apply terms like internal and external validity, reliability, and rigor. While these terms are sometimes employed in qualitative circles, (Drew *et al.*, 2008), there are epistemological reasons why others reject these terms (Mills *et al.*, 2010). Qualitative research use trustworthiness, credibility, transferability, dependability, confirmability, and authenticity (Guba, 1981; Lincoln and Guba, 1985; 1986; Pilot and Beck, 1978/2011). This section intends to discuss these considerations for proper standards of research for this study.

3.6.1 Quantitative Research Standards

3.6.1.1 Validity

Validity is defined as "the extent to which a measure can be shown to measure what it purports or intends to measure" (Cramer and Howitt, 2004; para. validity). Validity in this research speaks to whether the study explores the experience of participants within a modulated liminoid group learning activity. Two aspects make up validity: internal validity and external validity (Creswell, 2014). This section sets out to address any perceived threats to both internal and external validity that may arise in this study.

Internal Validity

The threats to internal validity discussed here are history, maturation, test practice, instrumentation, statistical regression, Hawthorne Effects, group composition, and experimental mortality threats (Drew *et al.*, 2008; Creswell, 2014). This section discusses areas where there are internal validity threats and mitigation strategies in this study. This section aims to demonstrate reasonable measures taken to guard this study from internal validity threats. This experimental design addresses history threats by testing both the control

group and experimental group simultaneously so that no elapsed time between groups can occur. Groups are selected from a population that has not yet undergone this experiment. This measure keeps participants from developing historical interaction with the material and possibly skewing results. Despite questions to rule out previous participation in the Traffic Jam activity, some participants reported having done the activity before. To safeguard against historical validity threats, the researcher silenced these participants for at least the first 10 minutes (but not exceeding 15) of the 20 to 30-minute Traffic Jam activity.

With respect to maturation threats, this experiment took around two hours. It is reasonably safe to assume that no developmental life change will occur during this experiment. This means there is no likelihood of maturation threats in this experiment.

When thinking of test practice threats, post-test only design guards against pre-test validity threats because there is no pre-test to skew post-test results. This point is a critical element in the design of this particular experiment. Pre-testing could influence participants' experiences in this activity because the questionnaire contains group dynamics language, which could alter the natural thought processes participants would usually bring to a facilitated group outside of an experimental context. This research hopes to explore facilitated groups in a modulated liminoid learning activity, not participants in an experimental lab-like environment. This research design excludes pre-tests because they influence participants, which threatens the internal validity of this study.

Instrumentation threats are another concern for internal validity. Quantitative survey tools remained constant during the experiment: no changes to the instrumentation took place. This experiment used a set of nine-point scale survey questions and open-ended survey questions. These questions, their order, and the delivery method stayed constant for the duration of the experiment. Instrumentation threats to internal validity do not appear to pose a validity threat.

Concerning the validity threat of statistical regression, this threat is guarded against by dividing participants into their two groups at random with no selection criteria. If groups had been created from the participant pool with criteria in mind, that would create a statistical regression weakness. Taking the step of randomly assigning participants in the experimental and control groups should control for the threat of over and underperforming groups, which would lead to statistical regression faults.

The Hawthorne Effect is an internal threat to validity that suggests that participants might change their behaviour simply because they are participating in an experiment. This threat is difficult for the researcher to protect against because the researcher might not know all of the participants well enough to identify behaviour that would suggest someone's demeanour has changed as a result of participation. The same is true when exploring questionnaire responses. The two strategies this research design chose to guard against the Hawthorne Effect were to make the study voluntary and to conduct the study amongst groups that have previous, organisational connections. First, the voluntary nature of participation in this experiment gives participants the option to opt-out of the activity instead of acting in a contrived manner for the sake of the research. Second, the experiment involves acting within a group where a participant has established social relationships and norms. For someone to act differently from their usual could result in minor consequences. These two elements of the design are the best options for mitigating the Hawthorne Effect in the activity itself. The Hawthorne Effect may still cause threats in another aspect of the research design: it could surface during the survey responses. If a participant's responses seem too dissimilar to their recorded activity, this could be grounds for removing their responses. Additionally, if participants demonstrate measurable response bias with the questionnaire, their responses could be removed. These are the best strategies available for mitigating the Hawthorne Effect in the questionnaire responses.

The bias in group composition threat diminishes with randomized groups. This research introduces the experimental variable following the participants' random assignments to separate groups. Were the groups divided by any criteria and non-random, this would become a quasi-experiment and would need different argumentation for controlling group composition threats to validity.

When considering experimental mortality, this test should ethically allow a participant to leave the experiment at any time due to stress, discomfort, or an undisclosed reason. Even with a participant leaving the trial early, the researcher will be aware of the situation and be able to judge whether the circumstances compromised the data in any way (Drew *et al.*, 2008). Experimental mortality could be an internal validity threat for this experiment if a participant chooses not to continue in the experiment because the collection of other participants' data took place after a participant left the group. Could a leaving participant affect the responses of others? When considering this in light of facilitated teamwork, it can be very damaging for a group to have someone drop out. During the study, no participants had to drop out during the Traffic Jam activity for any reason. As a result, the threat to experimental validity was not significant.

With the numerous possible threats to internal validity raised, there are apparent strengths and weaknesses of this experiment. Few matters of concern arise regarding history, maturation, test practice, instrumentation, statistical regression, group bias threats, and experimental mortality. The Hawthorne Effect poses the greatest threat to internal validity in this study. However, measures have been put in place to mitigate this effect as much as possible in the experiment design. With these factors in mind, the designed research should control to a reasonable degree of internal validity.

External Validity

The post-test-only control group experimental design controls against external validity threats. Threats to external validity discussed here are population-sample differences, artificial research arrangements, pre-test influence, and multiple treatment influence (Drew *et al.*, 2008). Concerns to these points of external validity will be raised in like manner to those raised in the internal validity section. When considering external threats to validity, this experiment is designed with an external, applicable focus in mind thanks to its pragmatist design. This study hopes groups and teams of all types to benefit from this work, so protecting external validity is paramount. According to Designing and Conducting Research in Education, "Population-sample differences are a threat to external validity because the participants in a study are not representative of the population to which generalization is desired" (Drew *et al.*, 2009, p.231). This question for this designed research is then, "Which sample population best represents the actual population to which the results of this study would apply?" A truly random population-sample does not accurately represent the actual population that would participate in group development activities.

Already connected groups and teams which seek to develop their relational abilities through facilitated activities are the usual clients who would participate in facilitated team development activities. These groups come from organizations that do not recruit randomly. The connections which bring them together could take several different forms. Possible examples of connected groups who would participate in a facilitated group activity include students studying in the same university, volunteers working together for charity, athletes playing a sport together, or a business team on a leadership seminar. These already connected groups would be the context where an organization would invite a facilitator to help develop a team's ability to work together. These groups are what the population-sample must represent because they are the target audience for the findings of the research.

This research intends to use non-random sampling when calling for participant volunteers to represent more accurately the non-random recipients of this research. Non-random sampling is a "[form] of sampling that [does] not adhere to probability methods" (Jupp, 2006, p.196). However, the aim of the method is still "to achieve a degree of representativeness without using random methods" (Jupp, 2006, p.196). There are various types of non-random sampling: quota, purposive, convenience, and model-based sampling (Lavrakas, 2008). Purposive and convenience sampling seem to be possible fits for use in this research design. The first method for non-random sampling considered is called purposive sampling. Purposive sampling allows informed choices while sampling populations because of expert input.

Purposive sampling's

> … main objective … [is] to produce a sample that can be considered "representative" of the population. The term 'representative' has many different meanings, along the lines of the sample having the same distribution of the population on some key demographic characteristic, but it does not seem to have any agreed-upon statistical meaning (Lavrakas, 2008, p.524).

Initially, this approach sounds more externally valid and applicable; but, the problem with this approach is that the researcher must select a specific sub-population to conduct the test. The findings are then applied back to that sub-population externally. For example, if the experiment uses a typical, random sample of outdoor learning students, then the results would be contextually bound to outdoor learning groups alone. The only case where someone could transfer this work to other sectors is if they redesigned the experiment having selected a different sub-population. This approach limits the scope of the research considerably. It seems that the outcomes of this research could apply to any group, so using purposive non-

random sampling targeted at a single sub-population would limit the possible applications and thus the external validity of the research.

The other method considered is convenience sampling. Convenience sampling helps when recruiting participants from difficult-to-access populations (Lewis-Beck *et al.*, 2004). Considering the fair degree of difficulty in accessing groups that met the size requirements for this experiment, convenience sampling certainly helped in calling for adequately-sized participants groups. Sampling to create random groups of people who did not know each would not have resulted in groups that reflected facilitated groups that happen naturally within organizations. An analogous occurrence is volunteer bias: when random volunteers participate, they only represent a subset of a population and not a true population sample (Salkind, 2010). Such a sampling method would have threatened external validity, so this convenience sampling approach seems best fit for maintaining the external validity of this research from a sampling point of view.

As mentioned in the introduction, sampling bias could occur through convenience sampling. Since the researcher is from an academic and religious background in the South-eastern United States, sampling only in that context could threaten the external validity of this study. This research also sampled non-academic and non-religious organizations to mitigate this threat. The study was conducted in the South-eastern United States, the United Kingdom and in Hong Kong. This approach to sampling diversified the sample and decreased the bias introduced as a result of a contextually-based researcher. These steps helped support the external validity of this study.

As a result, this research design is best suited to choose participants by way of convenient, non-random sampling. In light of population-sample external validity, choosing convenient non-random sampling is a suitable way to represent this research to groups and teams who will benefit from the results. The researcher conducted this experiment with as

many different types of groups as possible to develop the external validity of this research. The diversity of the studied groups will allow external observers to more easily consider how the findings of this study might apply to them. Convenience non-random sampling from a diverse set of populations guards against threats to the external validity of this study.

Artificial research arrangements do not likely pose a threat to the external validity of this research design. This research happened amongst groups in settings familiar to their organization, so it would be difficult to imagine how artificial research arrangements could influence the study. Choosing settings familiar to the participants controlled against external validity threat of artificial research arrangements.

When considering pre-test influence with respect to external validity, there is no pre-test or for participants. There is, however, a demographic intake survey. That survey asks for special participant considerations. It also asks if volunteers would like to facilitate their peers and how many years of leadership experience they have. Following the demographic intake survey, respondents participate in the experiment and then answer the post-test questionnaire; therefore, it is unreasonable to think that there would be a threat to external validity from pre-test influence.

The final matter to address in external validity is multiple-treatment interference. Multiple-treatment interference occurs when a group of participants receives more than one treatment, thus interpreting results grows more difficult. There is not a threat to external validity when offering a single treatment during the experiment (Drew *et al.*, 2008). Since this study only had one intervention, external threats by multiple-treatment interference did not appear.

With raising these matters of external validity, some seem weightier than others. The researcher will need to do little to protect this experiment from external validity threats due to artificial research arrangements, pre-test influence and multiple-treatment interference. The

greatest threat to the external validity of this research project happens with population-sampling. Because the researcher successfully recruited samples from organizations in a variety of contexts, some valuable mitigation to this threat occurred.

3.6.1.2 Reliability

Reliability is the degree to which a study will produce consistent results if it is repeated (Suter, 2012). Drew *et al.* (2008) offer this reflective question when approaching reliability: "If I collected [this] data at a different point in time, or using different methods, or if someone else collected them, how similar would the data be?" In theory, any iteration of this experiment that follows the guidance outlined in this research design should yield similar results.

A possible threat to reliability considers the temporal nature of academic discussion. If someone repeated this study in years to come, would it produce the same results? It stands to reason that the research should produce the same results, but all research is bound in the context of changing society (Cronbach, 1975). Time passing may affect the methodologies employed in this research design, but not beyond that which is acceptable to all research. Methodological reliability requires some serious consideration. This research employs mixed-methods research, employing a broad range of methods to gather extensive and varying types of data. With this being the case, a great amount of data could result in an analysis that may allow for a more in-depth view inside participant experience. Examples include follow-up surveys, interviews, or debriefs. Unfortunately, there was a limit on how much data this single research effort could process. Furthermore, the pragmatic desire behind this research is to conduct an exploratory study into modulated liminoid group learning activities. The hope is that this exploration motivates other researchers to deeper and more focused studies in modulated liminoid group learning activities.

The third consideration that Drew *et al.* raise is the repeatability of the designed experiment by other researchers. Repeatability speaks to the re-use of instruments designed to capture data. If the instruments developed and confirmed in this study were re-used, would they produce similar data? If future researchers used the originally proposed questionnaire, they would not find the same results. Factor analysis confirmed that items in the questionnaire needed adjustment. If the resulting instrument established through factor analysis sees use in future studies, it is more likely that similar data would result in that future study.

While temporal reliability does not pose an apparent threat to this research, methodological and instrumental threats to reliability arise. The strength of a pragmatic, exploratory study is its ability to study something new like MLGLS. Another advantage is that it opens the door for further research through reliability criticism. Instrumentation reliability is a confirmed threat in the original research design. The initial questionnaire would not produce the same results as determined through a factor analysis study. It is reasonable to consider that the resulting questionnaire after the factor analysis study might produce similar results. Though there are some weaknesses in the reliability of this study, the points where the reliability falls short are helpful for pushing forward new inquiry into modulated liminoid group learning studies.

3.6.1.3 Rigor

The final consideration for research design pertains to the rigor of this experiment. When discussing rigor, a few issues need raising. A complete dataset must come from the appropriate point(s) within the designed research. This project must responsibly interpret data, also factoring in unfavourable data points to the aims of the researcher. Data rendered in the study must fully integrate the views of the participants. Alternate explanations of the data must be raised and disqualified. Finally, the researcher must protect against observer bias

(Drew *et al.*, 2008). This section intends to address the threats to rigor that may occur in the design and completion of this study.

Options arise concerning where to collect data throughout the experiment. Collection along more than one point develops a sense of completeness for a resultant dataset. The researcher could gather data from the facilitator before watching the training video and following the viewing of the training video. Also, the researcher could test for data from the facilitator following their time facilitating the initiative. However, collecting data from the facilitator seemed unhelpful in light of the research question. The research question stands in the pragmatic perspective that participants in a group would have the best insight into their experience in a modulated liminoid group learning activity. A facilitator's perspective, good or bad, would not hold the same weight when compared against participants' perspectives.

Therefore, the most valuable data for the experiment will emanate from the participants themselves, not the facilitator. The facilitator will not undergo any testing. Therefore, the researcher should gather data from the participants under the notion that the most valuable data in the experiment lies in their midst. Again, questions of when to test during the experiment arise. Testing the randomly assigned group of participants can happen before and after the initiative experience within the experiment. As previously mentioned, a pre-test would be a threat to internal and validity on test practice grounds. Therefore, the data to be collected in this experiment will be from participants' post-tests only. This post-test will include the questionnaire and debrief measures taken immediately following the activity. This study also sent an email three weeks after the activity. These measures should produce a dataset complete enough to conduct rigorous analysis.

The next concern for the rigor of this experiment is how to interpret the data. Though rigor usually deals with quantitative data, this study is a mixed-methods approach that collects both qualitative and quantitative data for analysis. All viable quantitative data

collected will be used and initially analysed through factor analysis and structural equation modelling. An example of unviable data would include a questionnaire that demonstrates respondent bias. After this, quantitative findings and qualitative findings inform each other in a meta-inference mixed-methods analysis.

Unfavourable data toward the modulated liminoid group learning synthesis discovered in the findings are the next concern to rigor in experiment design. The responsibility falls upon the researcher to interpret any data that does not fit in with their hypothesis. Without the room for research to be inconclusive or weakly conclusive, the study and the reputation of the researcher become unreliable. Excluding unsupportive data hinders the reputation of those backing the researcher and does not show due respect to the research process. Instead, the researcher should "deliberately [seek] disconfirming evidence as conclusions begin to coalesce [allowing] the researcher to disqualify alternate explanations" (Drew *et al.*, 2008, p.235). A researcher who is dedicated not only to finding a favourable answer for their research question but also open to discovering unfavourable evidence leads to a more rigorous study.

When reflecting upon disconfirming evidence, the researcher also needs to consider differing interpretation possibilities. Researchers can interpret findings differently, so rigorous research anticipates alternate explanations for the findings and addresses them in the analysis. Asking oneself, "What other conclusions might others who interpret this same data produce?" Anticipating alternative interpretations demonstrates a higher degree of rigor in the research process because the researcher has already addressed possible critiques of their conclusion before public submission.

The topic of observer effects is the final threat to rigor that needs discussion for this research design. Observer effects happen when participants change their behaviour because of the presence of an observer. Several possible points of observation could influence the

group's behaviour. The observers in this experiment are video cameras, the facilitators, and the researcher. The following are the means by which observer effects are mitigated to the benefit of this study's rigor.

The first observer will be a video camera. This video camera will not have any bias to shed on the group, but will the group behave differently as a result of being recorded on video? The participants were informed about the presence of the camera and aware that it will only be used anonymously in the research. The informing of participants intended to reduce observer effects from video recording equipment on the participants. Participant identities from recordings will not be shared as their names will be changed in any video or survey transcript. With these measures in place, some mitigation against threats to rigor can take place concerning video recording equipment.

Facilitators could also be considered observers to some participants. Both the control and experiment facilitator will be in a different category outside of a regular participant with some level of authority over participants. This experiment chooses facilitators from within each population rather than from outside to decrease this possible threat to rigor. It is reasonable to think that facilitators who come from the same group as participants would exert far less observer effect upon a group than an outside facilitator or the researcher. Ultimately, the experiment needs a facilitator for each group, and the most rigorous choice was for facilitators familiar to the group.

The final observer in the research design who could cause behavioural changes amongst participants is the researcher. Because of the observer threat to rigor, the researcher should offer minimal interaction. The researcher will need to address participants when they arrive to complete intake forms. Beyond that, the researcher will frame the training video for the facilitators then allow facilitators to conduct the remainder of the experiment. This allows the researcher to decrease his involvement in the activity. The researcher will

communicate that the facilitator is in charge of leading their group and will offer input to a group or facilitator only when it would support the preservation of the experiment design without influencing its outcome. Once the group arrives at the success scenario in the initiative, surveys will be handed out by the researcher and any assistants offering only instructional comments about the survey. Those administering the survey cannot advise on how to answer the survey questions. With these measures in place, the researcher will diminish their observer interference.

Still, there are factors the researcher cannot limit. Participants may hope to "help" or "please" the researcher since they will come from convenience sampled populations of people who know about his efforts in pursuit of a degree. Though measures have been taken to diminish the observation effect on behalf of the researcher, the presence of the researcher might rest as the most challenging obstacle in maintaining rigor. While the aspects mentioned above can be raised here and addressed with the group strategically, the presence of the researcher is hard to remove altogether (Drew *et al.*, 2008) in this experiment.

There are benefits to having the researcher present as an observer. The researcher's presence increases the chances that the professionality, ethics, and design of the experiment are not compromised. The researcher needs to have a keen eye to notice when faults take place within the design, and if these faults need attention in the moment or within the written discussion following. Additional benefits of the researcher's presence occur within the writing by including the reflexivity they share. Sharing one's reflections allows readers to understand the researcher's motivations behind the research design. Reflexivity allows insight into the judgment calls the researcher made during the experiment design and conclusions. Reflexivity strengthens the reader's ability to follow arguments developed in research (Drew *et al.*, 2008).

Handling rigor concerns helps ensure the production of a reputable piece of research. A complete survey of all the possible outlets of data indicate that the best source of data will come from participants. Participants can communicate their experiences and perceptions better than anyone else in the research design. Interpreting all the data participants produced shows the researcher's willingness to consider supportive and unsupportive findings. Using disconfirming and confirming data creates a deeper sense of rigor in the research. Finally, the observers and especially the researcher are the greatest threat to the rigor of this research. With all these matters in mind, a rigorous experiment can go forward if the researcher addresses the concern raised in this discussion.

3.6.2 Qualitative Research Standards

Instead of using ideas like validity, reliability, and rigor like quantitative research, qualitative research uses different terminology when assessing research standards. The reason for this change is due to the context of and underlying assumptions associated with qualitative research (Mills *et al.*, 2010). There is some correspondence between the quantitative, positivist terminology and qualitative terminology. This connection happened because positivist terminology was the starting point where qualitative term development began, not because they are identical in meaning. Qualitative research uses different terms that were developed by Yvonna Lincoln and Egon Guba: trustworthiness, credibility, transferability, dependability, confirmability, and authenticity (Guba, 1981; Lincoln and Guba, 1985; 1986; Pilot and Beck, 1978/2011)

Trustworthiness

Trustworthiness is the main factor for conducting qualitative research at high standards. The issue of trustworthiness asks "How…an inquirer persuade[s] his or her audiences (including self) that the findings of an inquiry are worth paying attention to, worth taking account of" (Lincoln and Guba, 1985; p. 290). The study should maintain high

standards of design and execution. Five core elements need attention to produce a trustworthy study. These elements are credibility, transferability, dependability, confirmability, and authenticity (Pilot and Beck, 1978/2011). This element of the section of the methodology chapter will develop support for each of those five elements involved in conducting trustworthy research.

CREDIBILITY

Credibility developed from the notion of quantitative internal validity. Instead of focusing on the production of valid connections between a hypothesis and outcomes, credibility focuses on accurate reflections of the reality observed in the study (Lincoln and Guba, 1985). Participants and the researcher offered several forms of narrative response data in this experiment. This data must see representation in a way that aligns with the respondents' lived reality. A helpful posture for the researcher when sorting and coding data is to consider any possible interpretations of a piece of narrative data (Guba, 1981) and to choose the one that seems to most closely represent the meaning portrayed by the respondent.

The recommended method for making sure that the reality the researcher has identified matches the lived reality of respondents is through member checks (Guba, 1981). Member checks happen when the results of a study are shown to respondents to incorporate their feedback. Member checking would take place either as participants reviewed the transcript of a debrief or the themes produced through a coding analysis. Members checking transcripts can produce mixed results that may harm researcher relationships within a population (Carlson, 2010). Although these relational impacts can be minimized, this research rejected member checking. Since the researcher was using convenience sampling, the researcher could not risk ruining relationships within his personal and professional circles. The complex dynamic that happen in collective groups also poses challenges to individual members checking the themes produced in the coding analysis. Group themes

emerge by analysing participant responses together. These themes represent a collective, so an individual may not fully see or share the resultant themes of a group. For reasons of preserving relationships in convenience sampled populations and the complexity of the individual-group dynamic, member checking was ruled out as an inappropriate measure for establishing credibility for this study.

The tool selected for establishing credibility in this study was triangulation. Using three sources helped create a single account of each participant. Those sources included open-ended questionnaire responses, transcripts from video recorded debrief discussions, and written responses to follow-up emails. Using these three sources allowed for triangulation of data: the sources of data collected through different methods permitted a more robust representation of each person's experience to be developed. The research could treat data suspiciously if a participant responded differently in the debrief, the questionnaire, or in the follow-up email. This study seeks to explore not just the experience of individuals but also their shared group experiences. Therefore, respondents' data was also coded together thematically to describe processes taking place within the entire group. Using triangulation to develop robust accounts of each participant's experience and triangulating the collective experience of the majority of the group through a thematic analysis were the two ways of developing credibility in this research design.

TRANSFERABILITY

Transferability came as a response to positivist categories such as external validity and generalizability (Guba, 1981). Transferability is the degree to which a researcher's analysis would be true in a different context. Transferring conceptual themes and inferences is a challenge due to contextual differences between populations. This study intends to compare three groups from 12 sampled groups in a thematic analysis. Each of the three groups compared will come from the three different countries where sampling took place.

The diverse contexts used to produce a thematic analysis should allow for some reasonable insight into the transferability of this study.

Dependability

Dependability corresponds with the quantitative category of reliability. Dependability is pursued in this study by analysing three groups from three different cultural contexts. If analysing these three groups yield similar results, it can be assumed that using the instruments in this study elsewhere would also produce similar results. Finding similar results between different groups does not mean the themes developed in the same manner. Instead, it implies that similar processes occurred to produce the data. Therefore, this study uses diverse contexts to gain a notion of the research's dependability.

Confirmability

Confirmability developed from quantitative objectivity. While transparency supports objectivity in research methods (Guba, 1981), confirmability is different. Confirmability takes into account the contextual influence that a researcher unknowingly exerts on a study through its design. A researcher with an American background designed this research with supervision based in the United Kingdom. While this multi-cultural background could help create confirmability in a Western context, some populations analysed in this research are non-Western. Would a person from a non-Western background produce the study differently or use different forms of measure? This is a valid concern to the confirmability of this study. While efforts made may have reduced contextual bias, it was not possible to broaden the influence widely enough to completely factor out all of the researcher's context-based assumptions.

Authenticity

Authenticity comes from constructivism and asks questions about the research's effort to represent the differing participant realities in the study. When exploring a group's overall

experience through thematic study, some coded participant responses do not fit into thematic categories. These outliers would cause problems in quantitative study but are essential to represent in qualitative findings. If all the quantitative responses fit neatly into the thematic analysis, it would decay the credibility of the study as well. As a result, outlying individual realities that are separate from greater themes will be reported in the qualitative findings of this study.

3.7 Research Ethics

Ethical considerations were taken into account when designing this research according to the guidance offered through Liverpool John Moores University's Research Ethics Committee using the standards of practice represented in the British Educational Research Association's (BERA) Ethical Guidelines for Educational Research (2018). The primary areas of ethical concern outlined in that guidance focus on participants, sponsors of the research, the research community, and research publication. The most relevant category of ethical issues arises out of the relationship between the experiment and participants (Given, 2008). Participant recruitment and data management are the two areas that required the most ethical attention in this research design. Participant recruitment always occurred voluntarily through a gatekeeper associated with the participant's organization. Liaising with a trusted individual in their organization brought in an element of protection for participants. During the activity itself, the gatekeeper was always present, and participants could opt-out of the activity at any time. Once participants appeared in video recordings or responded to questionnaires, they produced data. Their resulting digital data was protected by always keeping it on password-protected servers, never revealing their names or any other identifying information in the study. Participants names are represented in this study using pseudonyms to protect the identity of participants. This research addressed ethical concerns

by protecting participant data and by working under Liverpool John Moore's Research Ethics Committee.

3.8 Research Aims

The first aim of this research is to produce a novel questionnaire to test the MLGLS. Appendix C outlines the development process for that questionnaire. The questionnaire aims to produce the first quantitative test of Group Developmental Stages Theory. This questionnaire also aims to test multiple layers of theory simultaneously to produce a new, synthesized theory to refine facilitators' understandings of group processes. This questionnaire hopes to measure data to propose that modulated liminoid spaces can be used as a learning tool. Ultimately, this research aims to produce a questionnaire that measures the MLGLS for current and future research.

This research also plans to test the difference between two groups where one group is expected to act in a slightly more unanimous manner. This is where the term modulated becomes important in the Modulated Liminoid Group Learning Synthesis. This research aims to explore whether the liminoid space can be controlled by extending it or shortening it through the use of additional challenges. If the liminoid space can be modulated, then facilitators could use the liminoid space as a powerful tool for facilitating optimal experiential learning.

The usefulness of such an aim rests in that problem outdoor group facilitators face. Outdoor group facilitators must regularly apply theories as they facilitate their respective groups. These group dynamics theories come from a variety of disciplines (Priest and Gass, 2018). Often these theoretical group facilitation skills are used in the background while the outdoor facilitator conducts hard-skill activities like alpine climbing, kayaking, or navigation exercises. This pragmatic research aims to produce a synthesis dense in supportable theory

and concise in its communication in order to provide the practitioner of outdoor group facilitation with a compact, tested, and useful tool.

Although this research emanates from the outdoor learning field, when researching group dynamics, any sector stands to benefit because most of our endeavours as humans involve working with others. Possible sectors to benefit could include business teams, educational groups, sports teams, non-profit and charity organization teams, and religious groups. It is difficult to express just how pervasive group work is in the human experience, which is why every effort was made to introduce diversity into the sampling of this research. Hopefully, this research speaks to such a relevant topic that those who read it approach their own groups with a new learning tool.

This research also aims to progress the usage of liminoid concepts in outdoor learning. Liminality has been used in outdoor learning studies and has fallen to a level of disuse in current research. Liminoid has only been used once in the discipline by Peter Varley in the article “Sea kayakers at the margins: The liminoid character of contemporary adventures” (2011). The literature review in this work hopes to suggest that liminoid concepts are better suited for use in the majority of outdoor learning scenarios. Since liminoid concepts have only been used in this one, qualitative study, this research also aims to be the first in the outdoor learning discipline to test Liminoid Theory using quantitative and mixed-methods approaches.

What outcomes are anticipated in response to the research question? This research suspects to produce some useful, tentative conclusions about group dynamics to inform the group facilitator. Exploring the experience of participants in a modulated liminoid group learning exercise should offer insight into patterns and themes that could help facilitators better understand what processes are running while conducting a group dynamics exercise. This research also anticipates that parts of the MLGLS will hold up, parts of it will be

disproven, and some of it will need refinement. The MLGLS may completely change in the end, but the pragmatic goal is to better understand the experiences of participants during the experiment to offer implications for practitioners concerning liminoid group learning in facilitation.

3.9 Research Limitations

Pragmatism trusts the process of inquiry to make refinements and corrections to errors in the long-term process of research (Lewis-Beck *et al.*, 2004). Therefore, this research effort wants to put forward a synthesis of macro group processes which other researchers can use as a starting point for refinement or even redevelopment in theorizing the multi-layered aspects of group dynamics interactions.

With the litany of group dynamic, psychological, sociological, anthropological, and other disciplined theories available, this study could not hope to exhaustively consider every proposed theory. It most certainly could not produce an ultimate understanding of how to facilitate a group. Nevertheless, the theories synthesized in this study come from a broad range of disciplines that study the human experience with the hopes that the findings in this study may make helpful suggestions to understanding group processes for use in facilitation.

3.10 Methodology Summary

This robust research design employs a convergent parallel mixed-methods approach to explore participants' experiences in an experiment that tests the Modulated Liminoid Group Learning Synthesis. This chapter has explained how this experiment employs a post-test control group design. Quantitative analysis will take place using confirmatory factor analysis and structural equation modelling. Qualitative thematic analysis will explore triangulated accounts of participant data to form three case studies from three different countries. These case studies will be compared. Further analysis will take place in a mixed-

methods format after quantitative and qualitative analysis procedures. This chapter has conducted a thorough review of threats to the quality standards of the research project.

4. Chapter 4 – Findings

4.1 – Findings Introduction

This findings chapter separately analysed the mixture of data collected in this mixed-methods experimental design. Quantitative data undergoes factor analysis, ultimately producing a causal structural equation model that describes latent processes experienced by participants in the Traffic Jam activity. This chapter explores qualitative data in two ways: through observational narrative and thematic analysis. Six observational narratives are presented in a story format, collected across three cases and constructed from multiple data sources. This chapter then compared those six narratives to describe common narrative elements and overarching narrative processes. Three thematic analyses are conducted across those same cases. The resulting narrative processes and themes are grouped together at the end of the qualitative section of this chapter. This chapter produced separate quantitative and qualitative findings, leaving the blending process for chapter five: the analysis chapter.

4.2 Quantitative Findings

This research employs multivariate analysis techniques to create a causal structural equation model (SEM) to illustrate the quantitative findings of this study. Making a causal SEM involves a multi-step process. First, this study screens a raw data set produced from the questionnaire (Appendix C) to hypothesise latent factors through Exploratory Factor Analysis (EFA). Next, the variables and latent factor correlations hypothesised through EFA undergo confirmation through Confirmatory Factor Analysis (CFA; Salkind, 2010). Importantly, CFA involves SEM as well: this study produces a CFA SEM and a causal SEM. Multivariate approaches like EFA, CFA, and causal SEM advantageously take into account measurement error by using multiple indicator variables to calculate a latent variable (Salkind, 2010).

Finally, the SEM produced through CFA allows this study to produce a causal SEM. Causal SEM explores the causation between the variables confirmed through CFA. These multivariate analyses and modelling processes use computer programs such as SPSS 25 and Amos 26 to facilitate the work. Producing this causal SEM allows this research to explore the connection between latent factors observed through the questionnaire.

4.2.1 Hypothesized Model

Developing a causal SEM usually begins by hypothesizing a model for testing. The research question asks, "What is the experience of participants in a modulated liminoid group learning activity (MLGLA)?" This research design phrases the research question differently than traditional quantitative research questions because of the broad, mixed-methods design of this research. Nevertheless, the research question leaves room to create quantitative hypotheses for testing to explore participant experience in a MLGLA. Hypothesis production begins with the literature review. The literature review illustrated the details of liminoid, flow, Co-Constructed Developmental Teaching Theory (CDTT), and Group Developmental Stages Theory (GDST). The literature review also illustrated connections between these theories based on the suggestions of scholars associated with those theories. Table 4.1 contains the proposed connections between those theories. These four connected theories produced a hypothesized synthesis called the Modulated Liminoid Group Learning Synthesis (MLGLS) which this research rendered into a graphic (Figure 4.1). These four theories also represent the four factors this study hypothesizes.

Table 4.1 - Literature Reviewed Areas of Commonality Across Theories

Literature Reviewed Areas of Commonality Across Theories					
Theory	Areas of Commonality				
Liminoid Theory	Pre-Liminoid, Separation	Liminoid, Transition	Liminoid/Post-Liminoid, Transition/ Incorporation	Liminoid/Post-Liminoid, Transition/ Incorporation	Post-Liminoid, Incorporation
Flow Theory		Apathy, Worry, Anxiety, Emotional Arousal, Boredom, Relaxation, Control		Flow	
CDTT	Framing	Activity	Debrief, Bridge-building, Pause, and Assimilation	Debrief, Bridge-building, Pause, and Assimilation	Debrief, Bridge-building, Pause, and Assimilation
GDST	Forming	Storming	Norming	Performing	Adjourning

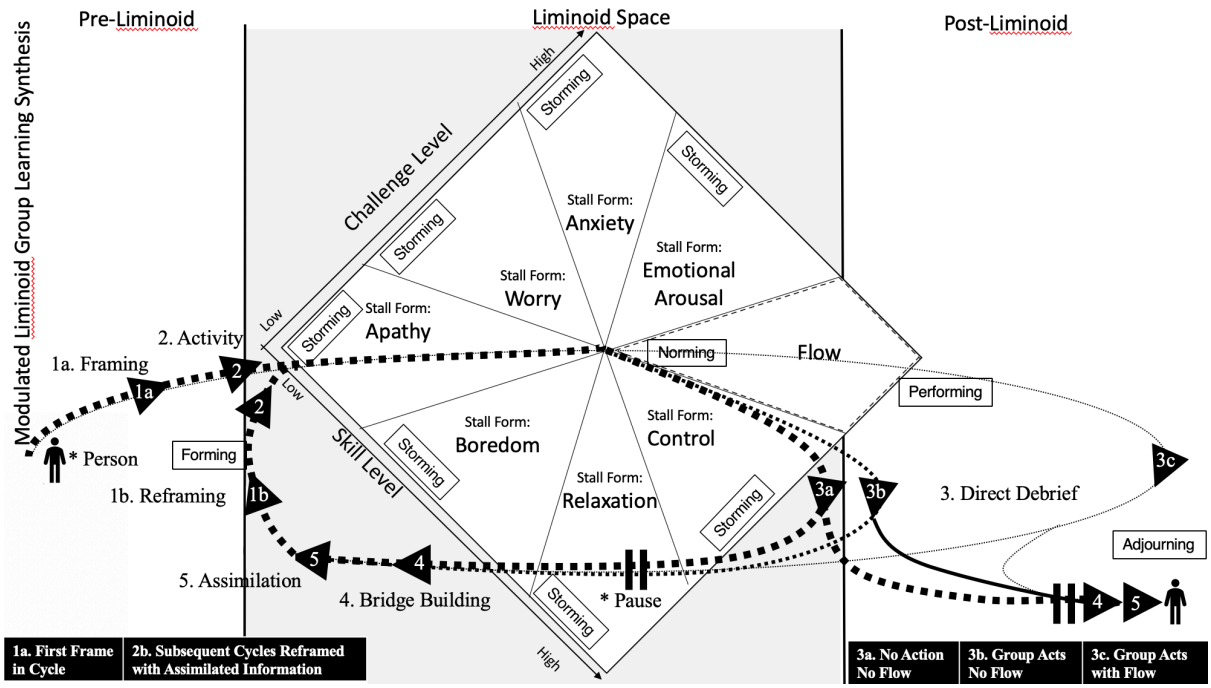


Figure 4.1 -Modulated Liminoid Group Learning Synthesis (MLGLS) Hypothesised Model

Like models produced through SEM, the MLGLS model has suggested path connections (Fig. 4.2; Table 4.2). Paths suggested in the MLGLS diagram start in the pre-liminoid phase. The pre-liminoid space, characterized by the forming stage and the framing phase, indicate the beginnings of a liminoid activity (Hypothesis 1).

Table 4.2 - Modulated Liminoid Group Learning Synthesis (MLGLS) Hypotheses

Modulated Liminoid Group Learning Synthesis (MLGLS)Hypotheses	
Hypothesis 1	Pre-Liminoid Forming and Framing → Liminoid Activity
Hypothesis 2	Liminoid Activity Challenge Level + Individual and Group Skill Levels → Storming Participant and Group Responses in Liminoid Space
Hypothesis 3	Participant and Group Storming → Cyclical Liminoid Debrief, Pause, Bridge-building, and Assimilation (Stalling)
Hypothesis 4	Participant and Group Storming → Norming and Performing with Possible Flow
Hypothesis 5	Norming and Performing with Possible Flow → Post-Liminoid Debrief, Pause, Bridge-building, and Assimilation Adjourning (Success Outcome)
Hypothesis 6	Participant and Group Storming → Post-Liminoid Debrief, Pause, Bridge-building, and Assimilation Adjourning (Non-Success Outcome)

Next, the challenge of the activity combined with the skills of the participants indicates the storming responses of participants in the liminoid space (Hypothesis 2). Group storming can lead to one of two outcomes. First, group storming can lead to a cyclical processing of the

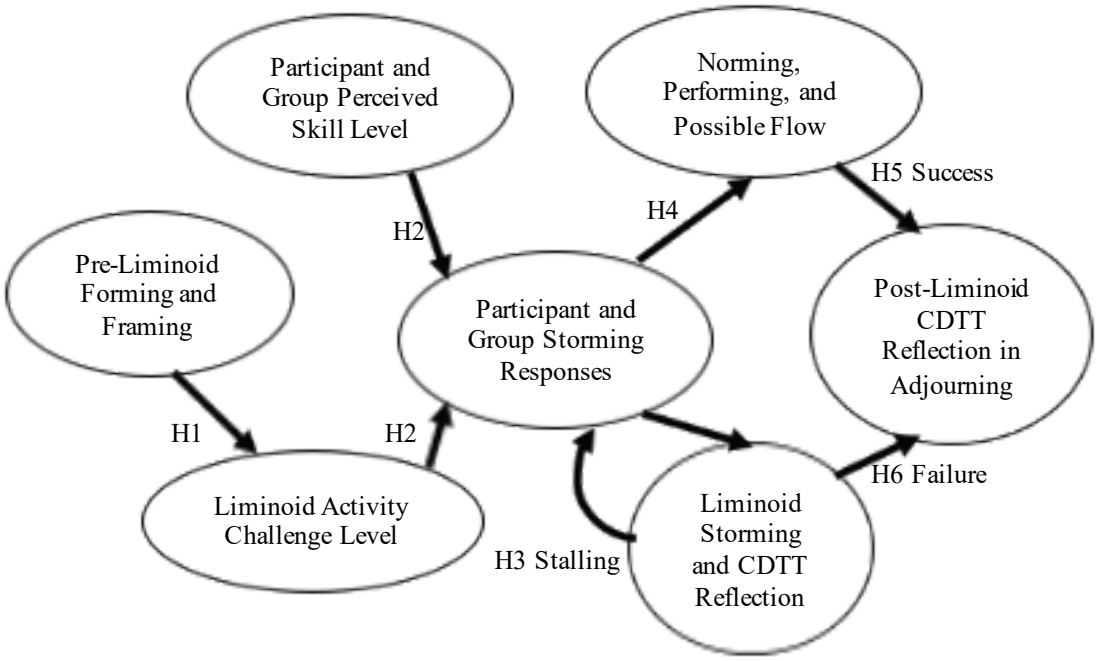


Figure 4.2 - MLGLS Hypothesised Model Converted Into Path Diagram

CDTT reflective actions within the liminoid space. These reflective actions include debriefing (which may occur internally or externally), pausing, bridge-building, and assimilation. This research refers to this cyclic failure and processing space that happens in liminoid as stalling (Hypothesis 3). Group storming can also lead to norming, performing, and possibly even a flow-type performance (Hypothesis 4). Norming, Performing, and Flow can all indicate the end of the liminoid activity as well as the beginning of the post-liminoid CDTT reflective practice through debriefing, pausing, bridge-building, and reframing process which happens while adjourning in the post-liminoid space. This process is associated with group success. (Hypothesis 5). Alternatively, prolonged storming can lead to the end of an activity that does not include success. This outcome still produces the CDTT reflective actions of debrief, pause, bridge-building, and assimilation in an adjourning post-liminoid space (Hypothesis 6). These hypotheses appear in Table 4.2 and as a hypothesized path diagram in Figure 4.2. Figure 4.1 offers the detailed, hypothesized diagram developed from the literature review for comparison. These hypotheses form only part of a hypothesized

answer to the research question: What is the experience of participants in a modulated liminoid group learning activity?" Confirming, confronting, or refining these hypotheses will ultimately help understand the experience of participants within the activity designed using MLGLS. Understanding their experience could lead to findings that may help address the research problem.

4.2.2 Data Screening

4.2.2.1 Missing Data

Data screening began with a raw data set of 171 participants from 12 different groups. This research calculated the number of respondents according to the number of completed participant consent forms and demographic intake surveys. Of these 171 participants, 24 agreed to facilitate and, therefore, did not complete a follow-up questionnaire. Of the 147 participants who completed consent forms and demographic surveys, 139 completed the follow-up questionnaire.

Screening occurred over the 139 completed questionnaires to discover missing values. Out of the 36 items on the questionnaire, 11 contained missing data. Of these 11 questions, which included missing data, no item presented a statistically significant amount ($p > 0.10$) of missing data (Newman, 2014). This lack of statistical significance toward amount of missing data shows that non-response to these 11 questions was random. Questionnaire items that included missing data underwent imputation to supply missing data points (Allison, 2003). Replacing missing data for a question involved calculating the median of non-missing responses to that question, then supplying that median number for the missing answers (Acuña and Rodriguez, 2004).

Following a screening test for missing answers to questions, the screening process checked for unengaged response bias. Screening for unengaged responses meant calculating a standard deviation score for the sum of every respondent's answers. Two respondent's

answers were removed from the dataset for disengagement as demonstrated by low standard deviations (SD = 0.167, 0.363) for their responses. A closer looked at their responses showed they offered the same answer from the third question through the 36th question. Typically, data screening would include an outliers test before offering a final conclusion on respondent numbers; however, all questions on this survey were categorial. One demographic question stood as the exception, but it produced no significant outliers when inspected. The resultant sample size after ruling out non-response producing facilitators (n=24), those who did not respond to questionnaires (n=8), and those who gave disengaged responses (n=2) equalled 137 (N=137). A multivariate analysis study using a sample of this size more than complies with the guidelines outlined for exploratory factor analysis (Mundfrom *et al.*, 2005). Criticism could arise toward this sample size for structural equation modelling, so this research takes a measure in the causal SEM phase to double-check the sample size for statistical power. In summary, this research successfully collected a viable sample size of 137 respondents, an appropriate amount for EFA with measures in place to double-check for statistical power in SEM.

4.2.2.2 Normality of Data

This study conducted a normality test upon the data by looking at the skewness and kurtosis of the data. Andy Field offers guidance on standards for allowable Skewness (*S)* and kurtosis (*K)* in a dataset. *S* or *K* scores below an absolute value of 1.96 demonstrate the normality of data with a 95% confidence interval ($p < 0.05$). Field adds that *S* and *K* scores below the absolute value of 2.58 demonstrate normality of data to a 90% confidence interval ($p < 0.10$) (Field, 2018). All the questionnaire items for this study fell within the stricter range of normality offered by Field except for questionnaire items Q8 and Q36. These two items fell within the less strict but acceptable parameter for kurtosis, demonstrating *K* scores

above the absolute value of 1.96 but below the absolute value of 2.58. As a result, this study considers the dataset normally distributed with an overall confidence interval of at least 90%.

4.2.3 Exploratory Factor Analysis (EFA)

The 137 respondents rendered data according to 36 reflective, indicator variables. EFA is an exploratory method "… that seeks to explain the relationship between indicator variables through a given number of previously undefined latent variables" (Salkind, 2010, p.216). These indicator variables were analysed using maximum likelihood estimation and promax rotation with Kaiser normalization. This analysis used promax rotation, an oblique rotation method, because it allows for factors to correlate (Field, 2018). This rotation method is not only ideal for exploratory research, but it also seems more appropriate for testing sociological constructs (Pett, Lackey, and Sullivan, 2003). Kaiser normalization speaks to a method of making data similar through scaling (Kaiser, 1958; Comrey and Lee, 2013; Pett *et al.*, *2003*). The factor estimation method, maximum likelihood (ML), helps determine the latent factors in the study. A study that intends to employ CFA and SEM benefits from selecting this method of factor estimation because it produces a positive definite correlation matrix with eigenvalues greater than zero (Pett *et al.*, 2003).

4.2.3.1 Initial Exploratory Factor Analysis

Kaiser-Meyer-Olkin Measure of Sampling Adequacy

An initial factor analysis produced problematic first results using the above methods. First, the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy was 0.738. The KMO test is a statistic that "… represents the ratio of the squared correlation between variables to the squared partial correlation between variables" (Field, 2018, p. 798). The KMO test produces scores on a scale from 0 to 1: 1 indicates compact patterns of correlation and indicates that a "… factor analysis should yield distinct and reliable factors" (Field, 2018, p.798).

Bartlett's Test of Sphericity

The initial test also yielded scores for Bartlett's test of sphericity that were insignificant ($p < 0.001$). The "Bartlett's test of sphericity examines whether the variance-covariance matrix is proportional to an identity matrix" (Field, 2018, p.757). While Field does not support this test, he and others give the guidance that a significant number ($p < 0.05$) is required to meet Bartlett's test of sphericity (Hair, Black, Babin, and Anderson, 2013). Because this initial test rendered a Bartlett score of 0.000, this test did not identify any areas of adjustment in the initial test.

Factor Reduction Choices

While model fit issues introduced in this initial test are important, the most important issue to consider in this initial factor analysis is the number of factors produced and the percentage of variance they explain. Factors are another name for the latent variables produced by the indicator variables. EFA hopes to discover the primary latent variables involved in a study that explain the greatest amount of variance. While there are ten factors in the initial analysis, it helpful to limit the number of factors in the analysis below this unconstrained result. Factor limiting is helpful because it allows for a smaller sample size (Mundfrom *et al.*, 2005). Another critical reason to limit factors is that factors need to be loaded by more than one indicator variable to adjust for measurement error (Salkind, 2010).

Eigenvalue Criteria Method

This study conducted two tests on the initial factor analysis to constrain the number of factors down from the original, unconstrained amount (10). This research first used the Kaiser test (1970) to limit factors. Kaiser's test (1970) enjoys popularity as a means for determining a constrained number of latent factors (Osborne, Costello, and Kellow, 2008). The Kaiser test, or the eigenvalue criteria method, suggested that factors scoring an eigenvalue above 1.0 should be retained (Kaiser, 1970; Salkind, 2007; Osborne *et al.*, 2008).

While this approach receives a high rate of adoption, it is perhaps not the best method of determining factor criteria (Osborne *et al.*, 2008).

Scree Test

Instead of using only the Kaiser test, this research also employs the scree test to reduce the number of factors. The scree test graphs each factor with its respective eigenvalue.

> The scree test involves examining the graph of the eigenvalues … and looking for the natural bend [or break] … in the data where the slope of the curve changes. The number of data points above the "break" (i.e., not including the point at which the break occurs) is usually the number of factors to retain… (Osborne *et al.*, 2008, p.89).

Others corroborate this approach (Salkind, 2007). Looking at the scree test of the initial exploratory factor analysis (Fig. 4.3), the bend or break that Osborne *et al.* refer to occurs at five factors. Therefore, the factors above the break should be retained. This study retains four factors as a result of the scree test.

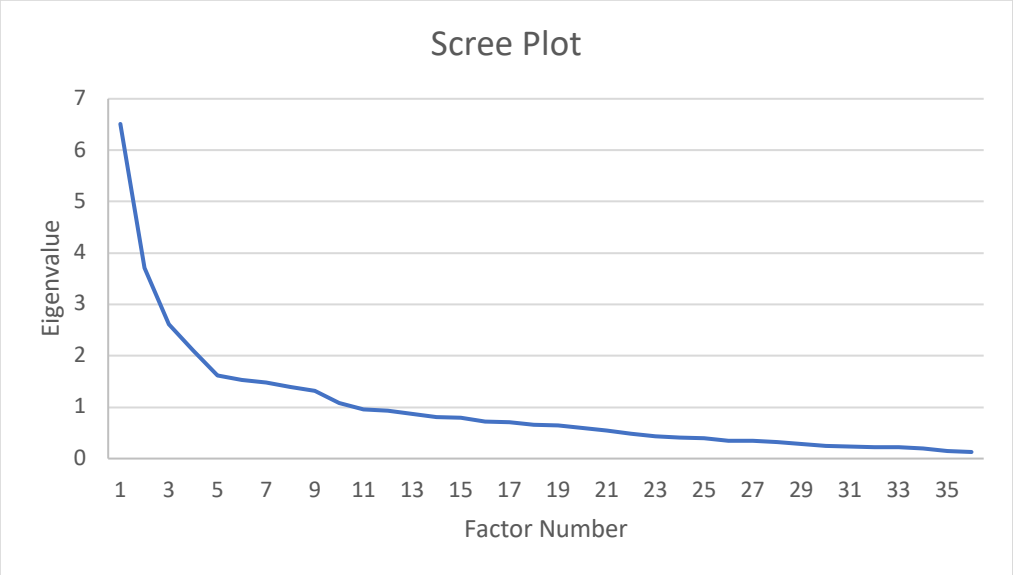


Figure 4.3 - Scree Plot for the Initial Exploratory Factor Analysis

Variance and Extraction Sums of Squared Loadings

While discussing factor reduction, variance explained is another metric to consider when determining factor numbers as well. Variance explained individually and cumulatively represents the amount of variance a factor shares (shared or common variance) resulting from indicator variables (Osborne *et al.,* 2008; Hair *et al.*, 2013). Ten factors with eigenvalues arose through this initial investigation which explained 64.9% of the total variance. After rotation (extraction sums of squared loadings), they explain 52.1% of the variance as depicted in Table 4.3. While there is no standard for explained variance, some suggest a general acceptance of 60% explained variance in the social sciences, but most concede lower thresholds are also acceptable (Hair *et al.*, 2013).

Case and point, one study supported a 20% explanation of variance by including considerations to alternative explanations for study conclusions (House, Spangler, and Woycke, 1991; Fichman, 1999). Some research dismisses variance extraction altogether (Lieberson, 1987). Lowest thresholds notwithstanding, this research finds 52.1% of variance explained after rotation from an initial, unconstrained factor test. With so many arguments for standards of explained variance, this exploratory study will strive for the highest possible explained variance despite Liebman's suggestions that such practice is "thoughtless and counterproductive" (1987, p.227). The eigenvalues, initial latent variables, percent of variance explained, and extraction sums of squares loadings are reported in Table 4.3.

Table 4.3 - Total Variance Explained, Initial EFA Test

Total Variance Explained, Initial EFA Test							
Initial Eigenvalues				Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings
Factor	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total
1	6.511	18.085	18.085	2.867	7.964	7.964	4.137
2	3.707	10.297	28.383	2.297	6.380	14.343	4.908
3	2.619	7.276	35.659	4.573	12.703	27.046	2.797
4	2.107	5.852	41.510	2.228	6.190	33.236	3.127
5	1.618	4.495	46.005	1.563	4.342	37.578	3.655
6	1.530	4.251	50.256	1.518	4.217	41.795	2.127
7	1.477	4.102	54.359	1.129	3.136	44.931	2.725
8	1.388	3.856	58.215	.935	2.596	47.528	1.412
9	1.322	3.672	61.887	.827	2.296	49.824	2.235
10	1.082	3.007	64.893	.813	2.258	52.082	1.671
11	0.952	2.643	67.537				
12	0.927	2.575	70.112				
13	0.874	2.428	72.540				
14	0.808	2.245	74.785				
15	0.790	2.194	76.978				
16	0.720	1.999	78.997				
17	0.703	1.952	80.929				
18	0.654	1.817	82.746				
19	0.647	1.798	84.544				
20	0.595	1.653	86.197				
21	0.542	1.506	87.702				
22	0.487	1.352	89.054				
23	0.431	1.198	90.252				
24	0.411	1.143	91.395				
25	0.396	1.099	92.494				
26	0.352	0.978	93.472				
27	0.343	0.952	94.425				
28	0.325	0.904	95.328				
29	0.286	0.795	96.123				
30	0.248	0.689	96.812				
31	0.234	0.650	97.461				
32	0.222	0.618	98.079				
33	0.215	0.598	98.678				
34	0.197	0.547	99.225				
35	0.151	0.420	99.645				
36	0.128	0.355	100.00				

4.2.3.2 Final Exploratory Factor Analysis

This study made subsequent inquires to discover the best possible extraction and loadings of predictor variables onto the resultant four latent factor variables. Predictor variables that did not extract with communalities above 0.200 (Child, 2006; Yong and Pearce, 2013), did not load onto a factor above 0.300, or were heavily cross-loaded were removed through an iterative process (Hair *et al.*, 2013). Yong and Pearce argue that 0.200 is too low for an extraction communalities threshold; however, other research has demonstrated that communality thresholds should be considered in light of sample size (Mundfrom *et al.*, 2005). Therefore, this study accepts a threshold range of 0.200 to 0.800 for communality scores (Mundfrom *et al.*, 2005). Factor loadings above 0.500 demonstrate statistical significance at this point in the findings as well (Hair *et al.*, 2013). As a result of these thresholds, this study removed 17 indicator variables: nearly half of the items on the questionnaire.

Kaiser-Meyer-Olkin Measure of Sampling Adequacy

The remaining indicator variables underwent tests for measures of sampling adequacy. This research found those 19 remaining variables to demonstrate a "middling" (Kaiser and Rice, 1974; Field, 2018) KMO score (0.752) and a non-significant Bartlett's Test of Sphericity ($p < .005$) as reported in Table 4.4.

Table 4.4 - KMO and Bartlett's Test, Final EFA

KMO and Bartlett's Test, Final EFA		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy		0.752
Bartlett's Test of Sphericity	Approx. Chi-Square	1033.369
	df	171
	Sig.	0.000

COMMUNALITIES OF EXTRACTED VARIABLES

Almost all the extracted indicator variables exceeded the 0.200 threshold for communalities supported by this exploratory factor analysis. This research made one exception and retained Q20 as it was close to the threshold (0.186), deciding to monitor it closely to decide whether it promoted the factor solution or caused more problems. Commonalities are reported in Table 4.5 below.

Table 4.5 - Communalities, Final EFA

Communalities		
	Initial	Extraction
Q3 –At some point during this activity, I began to understand how to complete the activity. (Forming/Task)	0.612	0.657
Q4 – I began to see how my group members would relate to one another in this specific activity. (Forming/Relationship)	0.652	0.697
Q7 – At some point during this activity, I was able to share my ideas about how to complete the activity. (Forming/Relationship)	0.457	0.396
Q8 – At some point during this activity, it seemed like my group improved in our ability to work together. (Norming/Task)	0.393	0.349
Q9 – At some point during this activity, I viewed my role within the group as doing whatever was needed to help complete the activity. (Performing/Task)	0.517	0.466
Q10 – At some point during this activity, a point was reached where any disagreements about how to complete	0.402	0.341
Q16 – Overall, how skilled were you at this activity? (Flow/Skill)	0.418	0.220
Q19 – While engaged in the activity I felt in control. (Flow/Felt Control)	0.455	0.337
Q20 – While engaged in the activity, I lost track of time. (Flow/Temporal Distortion)	0.218	0.184
Q22 While engaged in the activity, I had a high level of concentration. (Flow/Concentration)	0.555	0.475
Q23 – While engaged in the activity, I forgot personal problems. (Flow/Forgot Personal Problems).	0.541	0.677
Q24 – While engaged in the activity I felt fully involved. (Flow/Involvement)	0.652	0.697
Q25 – At some point during the activity, I began to think less about my daily concerns (Pre-Liminoid/Daily Concerns)	0.498	0.551
Q30 – I shared my ideas about how to accomplish the task with the group. (Liminoid/Relational Sharing Risk)	0.577	0.723
Q31 – At some point during this activity, whether I shared or not, I was uncertain how others in the group would respond to me. (Liminoid/Relational Sharing Fear)	0.313	0.250
Q32 – Something happened in this activity that caused me to think about how I treat others. (Post-Liminoid/Relational Learning/CDTT/Bridge-building)	0.694	0.806
Q33 – Something happened during this activity that caused me to think about how others treat me. (Post-Liminoid/Relational Learning/CDTT/Bridge-building	0.674	0.715
Q34 – Having finished this activity, I found myself considering how I would work with future groups of people differently than before. (Liminoid/Relational Learning/CDTT/Assimilation)	0.373	0.301
Q37 – I was able to ask questions of myself, my teammates, or the facilitator in order to understand what was happening in the activity. (CDTT/Direct Debrief)	0.356	0.307
Extraction Method: Maximum Likelihood		

Total Variance Explained and Extraction Sums of Squared Loadings

The initial eigenvalues of the four-factor model account for 57.659% of the total variance (Table 4.6). The extraction sums of squared loadings account for 48.148% of the variance. This is a decrease from the original ten factor model as a consequence of the reduction of latent factors. The decrease in extraction sums of squared loadings allows for an improved model fit and factor loadings.

Table 4.6 - Total Variance Explained, Final EFA

Total Variance Explained, Final EFA							
Initial Eigenvalues				Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings
Factor	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total
1	4.865	25.607	25.607	4.335	22.814	22.814	3.415
2	2.531	13.323	38.930	2.156	11.349	34.163	3.735
3	2.250	11.845	50.774	1.824	9.600	43.763	2.077
4	1.308	6.885	57.659	0.833	4.385	48.148	2.405
5	1.148	6.044	63.703				
6	0.914	4.813	68.516				
7	0.841	4.429	72.945				
8	0.772	4.064	77.009				
9	0.731	3.845	80.854				
10	0.605	3.185	84.039				
11	0.566	2.978	87.017				
12	0.462	2.431	89.448				
13	0.415	2.187	91.635				
14	0.347	1.828	93.463				
15	0.344	1.809	95.272				
16	0.279	1.467	96.740				
17	0.242	1.276	98.015				
18	0.224	1.276	99.195				
19	0.153	0.805	100.000				

Extraction Method: Maximum Likelihood.
a. When factors are correlated, sums of squared loadings cannot be added to obtain a total variance.

Validity of Exploratory Factor Solution

Convergent Validity of Exploratory Factor Solution

This EFA addresses convergent validity linking indicator variables to a latent factor. Convergent validity assesses the "… degree to which two measures of the same concept are correlated" (Hair *et al.*, 2013, p.124). This EFA develops convergent validity by removing indicator variables that load onto latent factors at a threshold below 0.300. Except for Q16 and Q31, all indicator variables load onto factors above 0.400. While this may not be the strongest requirement for convergent validity, the confirmatory factor analysis will continue the exclusion process, removing weakly convergent indicator variables from the overall set.

Discriminant Validity of Exploratory Factor Solution

Unlike convergent validity, discriminant validity addresses distinctness between two latent factors (Hair *et al*., 2013, p.124). This EFA develops discriminant validity by removing strongly cross-loaded factors (Hair *et al.*, 2013; Lowry and Gaskin, 2014). This act allowed indicator variables to load distinctly onto their respective latent factors. This EFA also produced a factor correlation matrix to determine discriminant validity (Table 4.7). Factors should not correlate with other factors in the correlation matrix above 0.7 (Hair *et al.*, 2013; Lowry and Gaskin, 2014).

Table 4.7 - Factor Correlation Matrix, Final EFA

Factor Correlation Matrix				
Factor	1	2	3	4
1	1.000	.520	.118	.095
2	.520	1.000	-.033	.443
3	.118	-.033	1.000	-.050
4	.95	.443	-.050	1.000
Extraction Method: Maximum Likelihood. Rotation Method: Promax with Kaiser Normalization				

In the pattern matrix (Table 4.8), the first latent factor loads with questions Q3, Q4, Q8, Q9, and Q10. As indicated in the notes following each question, those questions incorporated Group Developmental Stages Theory (GDST) into their design. Q7, Q16, Q19, Q22, Q24, Q30, and Q37 loaded onto latent factor two. The seven questionnaire items that loaded onto factor two developed from a selection of theories. In the questionnaire, Q7 developed from GDST (Q7).

Table 4.8 - Final EFA Pattern Matrix

Final EFA Pattern Matrix[a]				
	Factor			
	1 $\alpha = .800$	2 $\alpha = .807$	3 $\alpha = .778$	4 $\alpha = .689$
Q3	0.844			
Q4	0.748			
Q8	0.609			
Q10	0.581			
Q9	0.543			
Q30		0.991		
Q7		0.644		
Q24		0.625		
Q19		0.517		
Q22		0.438		
Q16		0.317		
Q37		0.315		
Q32			0.885	
Q33			0.847	
Q34			0.538	
Q31			0.467	
Q23				0.839
Q25				0.760
Q20				0.453
Extraction Method: Maximum Likelihood. Rotation Method: Promax with Kaiser Normalization. a. Rotation converged in 6 iterations.				

Flow Theory influenced Q16, Q19, Q22, and Q27. Liminoid Theory went into Q30. Co-Constructed Developmental Teaching Theory (CDTT) informed the wording of Q37. Factor three loaded with four indicator variables (Q31, Q32, Q33, and Q34). The questions associated with these indicator variables all developed out of Liminoid Theory, and three of them overlapped conceptually with CDTT (Q32, Q33, and Q34). The fourth factor loaded

with three indicator variables (Q20, Q23, and Q25). Two of these indicator variables were measured with questions designed using Flow Theory (Q20, and Q23). The other was measured using a question designed with Liminoid Theory (Q25). Importantly, Q20 received an underperforming communality score (0.186); however, including this indicator variable becomes more advisable in the light of factor loadings. Retaining Q20 allows the statistically desirable possibility of a three-indicator solution for latent factor four (Hair *et al.*, 2013).

Reliability of Exploratory Factor Solution

This EFA calculated reliability by taking a Cronbach α (Cronbach, 1951) score across the indicator variables in relation to their loaded factor (Field, 2018). Factor one had five indicator variables and produced α =0.800. Factor two had seven indicator variables and produced α =0.807. Factor three had four indicator variables, which produced α =0.778. Factor four had three indicator variables and produced α =0.689. Furthermore, defining a standard of reliability when using Cronbach's α is difficult due to the litany of research supporting numerous reliability thresholds from 0.8 all the way down to 0. (Field, 2018). A more informed approach considers the number of variables included to produce α. Since α scores generally increase when more variables are used to produce the scores (Cortina, 1993), the factor reliability scores reported in these findings can be accepted on the grounds of the number of variables used to produce them.

4.2.3.3 Exploratory Factor Analysis Summary

Data produced from this study were screened: that process produced viable response data from 137 participants. This research subjected the resultant dataset to exploratory factor analysis. As a result, this research discovered 19 indicator variables loaded onto four latent factors as determined by a scree plot test. These resultant factors demonstrated acceptable adequacy as determined by the KMO test (0.752), Bartlett's scale ($p < 0.005$), and most indicator factor extraction communalities between 0.200 and 0.800. This study achieved

convergent validity with indicator variables loading onto the four latent factors by 0.300 or more. This study achieved discriminant validity between loadings by removing any variables with high cross-loadings and confirming that latent factors did not correlate more than 0.700. Reliability tests found acceptable levels of reliability based on factor α scores considering the number of variables used to produce each score. The resulting 19 indicator variables and the four latent factors represent a statistically-based theory that was developed by considering all possible connections between indicator variables and latent factors (Hair *et al.*, 2013). As a way of testing this theory, this research will subject the EFA hypothesis to confirmatory factor analysis.

4.2.4 Confirmatory Factor Analysis (CFA)

Confirmatory factor analysis is different from exploratory factor analysis. EFA explores how indicator variables relate to "previously undefined latent [factors]" (Salkind, 2010, p.216). The EFA associated with this study resulted in a hypothesized set of connections between indicators and factors. Confirmatory factor analysis tests those hypothesized relationships discovered through EFA (Salkind, 2010) as well as inter-factor correlations and distinctions. CFA will also allow the production of a visual model because CFA is a type of structural equation modelling. Hair *et al.*, (2013) write, "Structural equation modelling is a family of statistical models that seek to explain the relationships between multiple variables" (p.567). CFA is a type of SEM and therefore allows the generation of a visual model to depict the relationships between indicator variables and latent factors (Salkind, 2010; Hair *et al*., 2013). Constructs are an important concept to introduce in this section. Constructs in structural equation modelling "… are unobservable or latent factors represented by multiple variables…" (Hair *et al*., 2013, p.546). So far, this research referred to constructs only as latent factors. When visually rendering indicator variables and latent factor constructs, computer programs greatly ease the process. CFA goes beyond the scope of

SPSS because SPSS does not have graphic modelling capabilities. This research effort required another computer program called Amos to render variables and constructs visually (Field, 2018). Most importantly, this research employs CFA because it is a means of testing the statistically-based theory developed through EFA (Hair *et al.*, 2013).

4.2.4.1 Initial Confirmatory Factor Analysis and Model

An initial SEM for confirmatory factor analysis was developed by depicting the influence that indicator variables had upon the four latent factor constructs. Each indicator variable also received influence from another construct unique to each indicator variable. This paired influencer variable represented measurement error (e1, e2, etc.). Covariation of factor constructs took place by connecting them with two-headed arrows. This research developed the initial model by inputting the pattern matrix produced through exploratory factor analysis in SPSS into AMOS 26 using a plugin tool (Gaskin, 2016). In this initial model, factor constructs were named based on the indicator variables which loaded upon them. Construct one (Table 4.9) was named *GDST*[1] since all of its loaded variables were measured using questionnaire items based on the Group Developmental Stages Theory.

[1] GDST when non-italicised refers to Group Developmental Stages Theory while *GDST* with italics refers to the latent factor construct discovered through factor analysis in the quantitative findings.

Table 4.9 - Construct Factor 1: Group Developmental Stages Theory (*GDST*)

Construct Factor 1 – Group Developmental Stages Theory (*GDST*)		
Item Number	Questionnaire Item Wording	Theory Used to Develop Item
Q3	"At some point during this activity, I began to understand how to complete the activity."	Forming in Task Dimension
Q4	"I began to see how my group members would relate to one another in this activity."	Forming in Relationship Dimension
Q8	"At some point during this activity, it seemed like my group improved in our ability to work together."	Norming in Task Dimension
Q9	"At some point during this activity, I viewed my role within the group as doing whatever was needed to help complete the activity."	Performing in Task Dimension
Q10	"At some point during this activity, a point was reached where any disagreements about how to complete the task were settled."	Performing in Relationship Dimension

Construct two (Table 4.10) was named "*PersInvst*" to represent a respondent's personal investment. Construct two was named by looking at common ideas shared by the questions since the subset of questions that loaded onto factor two came from different theories. The questions generally seemed to relate to actions taken by participants toward personal investment in the

Table 4.10 - Construct Factor 2 - Personal Investment (*PersInvst*)

Construct Factor 2 – Personal Investment (*PersInvst*)		
Item Number	Questionnaire Item Wording	Theory Used to Develop Item
Q7	"At some point during this activity, I was able to share my ideas about how to complete the activity."	Norming in Relationship Dimension
Q16	"Overall, how skilled were you at this activity?"	Flow related Skill Perceptions
Q19	"While engaged in the activity, I felt in control."	Flow related Control Perceptions
Q22	"While engaged in the activity, I had a high level of concentration."	Flow related Concentration
Q24	"While engaged in the activity, I felt fully involved."	Flow related Involvement
Q30	"I shared my ideas about how to accomplish the task with the group."	Mid-Liminoid related Relational Risk-Taking
Q37	"I was able to ask questions of myself, my teammates, or the facilitator in order to understand what was happening in the activity."	CDTT Direct Debrief

activity. Construct three (Table 4.11) was named *RelLearn* to represent relational learning. All three indicator variables associated with this factor construct related to the reflective practice associated with Liminoid Theory and Co-Constructed Developmental Teaching Theory. Finally, the fourth factor (Table 4.12) was named "Engrossed" to represent the

forgetfulness of outside reality that comes with focusing intensely on an activity. The following four tables show questionnaire item wording and the associated theory used to build each questionnaire item. This research shares the decision-making process in naming the latent factor constructs to preserve the validity of this experiment around construct naming.

Table 4.11 - Construct Factor 3 - Relational Learning (*RelLearn*)

Construct Factor 3 – Relational Learning (RelLearn)		
Item Number	Questionnaire Item Wording	Theory Used to Develop Item
Q31	"At some point during this activity, whether I shared or not, I was uncertain how others in the group would respond to me."	Mid-Liminoid related Relational Sharing Fear
Q32	"Something happened in this activity that caused me to think about how I treat others."	Post-Liminoid related Relational Learning and CDTT Bridge-building
Q33	"Something happened during this activity that caused me to think about how others treat me."	Post-Liminoid related Relational Learning and CDTT Bridge-building
Q34	"Having finished this activity, I found myself considering how I would work with future groups of people differently than before."	Post-Liminoid Relational Learning and CDTT Assimilation

The resulting model, including standardized scores for loadings and correlations, is represented in Figure 4.4. This model is the starting point from which the CFA will commence. A model produced through CFA SEM is judged on a set of metrics that allow considerations about how accurately the model reflects the data it represents. This research will use several different indices for scoring model-fit to hone down an initial model to create a best-fit model. A resulting best-fit model will show how the indicator variables load onto factor constructs and will also show how those constructs covary.

Table 4.12 – Construct Factor 4 – Engrossed (*Engro*)

Construct Factor 4 – Engrossed (Engro)		
Item Number	Questionnaire Item Wording	Theory Used to Develop Item
Q31	"While engaged in the activity, I forgot personal problems."	Flow related Forgetting of Personal Problems
Q32	"At some point during the activity, I began to think less about my daily concerns."	Pre-Liminoid Forgetting of Daily Concerns
Q33	"While engaged in the activity, I lost track of time."	Flow related Temporal Distortion

4.2.4.2 Model Fit Indices

This study employs a variety of model fit indices to set parameters in place for developing a model that accurately represents the collected data. Traditionally, the chi-squared difference test was used to test model fit by comparing the observed covariance matrix against the estimated covariance matrix (Hair *et al.*, 2013). A researcher would determine a significance value between the two compared matrices: if it was insignificant (*p*-value of model > 0.05), then the researcher could assume the estimated model produced through SEM matched the observed data (2013). The chi-square difference test remains in use as a cursory measure of model fit; however, research shows how sample size, among other effects, influence this metric (Fornell and Larcker, 1981; Hu and Bentler, 1991; Hair *et al.*, 2013). Model-fit indices emerged as a response to critiques against the chi-square difference test throughout the 1980s to better assess model fit (Hu and Bentler, 1991). This study employs eight measurement indices that offer thresholds for developing model fit (Table 4.13). Here each model fit measurement index included in this study is listed with its abbreviation and threshold score in parenthesis.

Table 4.13 – Model Fit Index Thresholds

Model-Fit Index Thresholds							
χ^2/df	p-value of model	CFI	GFI	AGFI	SRMR	RMSEA	PCLOSE
<3	p > 0.05	> 0.95	> 0.95	> 0.80	< 0.09	< 0.05	> 0.05

These score indices used in this study to determine model fit are the Chi-square difference test (χ^2 or cmin/df in SPSS; < 3), taking a significance value of the difference between the observed and estimated covariances matrices ($p > 0.05$), checking the comparative fit index (CFI; > 0.95), checking the goodness of fit index (GFI; > 0.95), checking the adjusted goodness of fit index (AGFI; > 0.80), checking the standardized root mean squared residual (SRMR; < 0.09), checking the root mean squared error of approximation (RMSEA; < 0.05), and checking there is no significance in the RMSEA sample (PCLOSE; > 0.05). Experts

advocate the use of combinations of model fit indices (Hu and Bentler, 1991; Hair *et al.*, 2013) because they help avoid Type I and Type II errors in assessing hypotheses (Hu and Benlter, 1991). If the model scores fall within acceptable parameters for each of these eight indices, that would suggest that the resulting CFA model (Fig. 4.4) accurately estimates relationships between indicator variables and latent factor constructs based on the observed measures taken in the questionnaire.

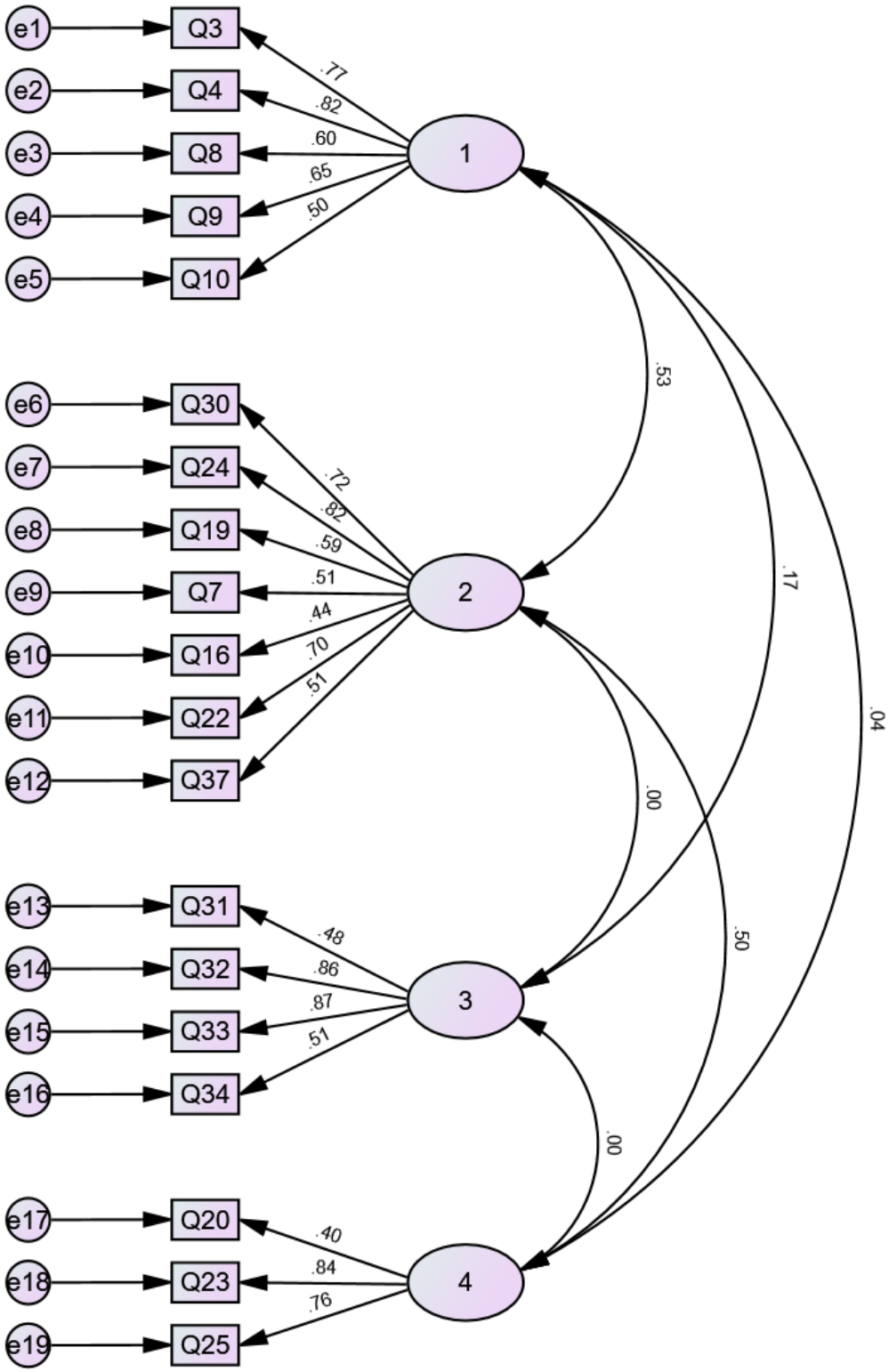


Figure 4.4 - Initial CFA Model Iteration

The initially constructed model based on the EFA rendered in Figure 4.4 presented scores outside the acceptable parameters suggested by Hu and Bentler (1991) for model fit

(Table 4.14). The initial model meets many of the parameters for model-fit accepted by this study. One major shortcoming is that the estimated covariance matrix is significantly different from the observed covariance matrix model (p-value < 0.05). Additionally, this model shows low scores on CFI, GFI, and AGFI. Finally, the PCLOSE score is unacceptably significant. While this model is outside of the parameters for good model-fit, it sets the point from which the iterative process of model improvement can commence.

Table 4.14 - Model Fit Index for Initial CFA Model

Model-Fit Index for Initial CFA Model							
χ^2/df < 3	p-value of model p > 0.05	CFI > 0.95	GFI > 0.95	AGFI > 0.80	SRMR < 0.09	RMSEA < 0.05	PCLOSE > 0.05
2.061	0.000	0.832	0.861	0.760	.0870	.000	.000

4.2.4.3 Final CFA Model

Following an iterative process of model adjustment (Hair *et al.*, 2013), this research identified a model that more closely fits parameters. The resulting model scores are as follows. In addition to developing appropriate model fit scores for the CFA SEM, this study took further steps to ensure the validity and reliability of the model. First, a configural invariance test was made on the final model.

Model Validity and Reliability

Convergent Validity and Construct Reliability (CR)

The final model underwent a testing process for construct validity. This process inquired into the convergent and discriminant validity represented in the model (Table 4.15). First, the model was tested for convergent validity: the degree to which indicator variables load onto a latent factor construct. The first way of testing convergent validity used in this research was taking a construct reliability (CR) score (Hair *et al.*, 2013). Construct reliability (CR) measures the degree to which indicator variables load onto latent factor constructs taking into account error at the indicator variable level (Fornell and Larcker, 1981). A CR

score is assigned to each latent factor construct in the CFA SEM and should be above the threshold of 0.700 to indicate good reliability (Hair *et al.*, 2013). Each latent factor construct scored above the 0.700 threshold for CR with the final model.

AVERAGE VARIANCE EXTRACTED (AVE)

Another way of evaluating the convergent validity of the model produced by this research was to calculate scores for the average variance extracted (AVE) for each latent factor construct in the study (Table 4.15). AVE calculates the amount of variance explained by a latent factor construct by taking into account error at the latent factor level (Fornell and Larcker, 1981). As a result, AVE is a more scrutinizing way of examining the convergent validity in a model.

Table 4.15 - CFA Validity and Reliability Measures

CFA Validity and Reliability Measures								
	CR	AVE	MSV	MaxR(H)	*RelLearn*	*GDST*	*Invest*	*Engro*
RelLearn	0.803	0.591	0.047	0.910	0.769			
GDST	0.747	0.505	0.047	0.832	0.217	0.711		
Invest	0.774	0.465	0.219	0.796	0.029	.464	.682	
Engro	0.722	0.483	0.219	0.797	0.016	-0.022	0.468	.695
Master Validity Checker, Stats Tools Package (Gaskin, 2016)								

The threshold AVE for a factor should be above 0.500, but exceptions can be made to this threshold when a model produces good construct reliability scores (Fornell and Larcker, 1981; Malhotra, Hall, Shaw, and Oppenheim, 2006). This model scored within parameters for constructs *GDST* (0.591) and *PersInvst* (0.505), but produced underperforming AVE scores for *RelLearn* (0.465) and *Engro* (0.483). These weaker AVE scores are accepted in this exploratory study on the grounds of acceptable convergent reliability scores, meaning the overall convergent validity of this model can be accepted.

Discriminant Validity

Next, the CFA model underwent tests for discriminant validity. Discriminant validity investigates the degree of difference between each latent factor construct within a model. The way to test for discriminant validity between two constructs is to square the correlation estimate between those two constructs and compare it to the average variance extracted (AVE; Table 4.15; Hair *et al.*, 2013). This produces a maximum shared variance (MSV) score (Gaskin, 2016), which should always be lower than the AVE for a latent construct (Hair *et al.*, 2013). After assessing the model used in this confirmatory factor analysis, there were no MSV scores greater than any AVE score. This measure supports the discriminant validity of this model.

Common Method Bias

Next, the CFA model was subjected to a test to explore possible bias as a result of the variance introduced through the measurement method (Podsakoff, MacKenzie, Lee, and Podsakoff, 2003). Sources of variance from measurement method include "…having a common rater, a common measurement context, a common item context, or … the characteristics of the items themselves" (2003, p.885). Podsakoff *et al*. (2003) recommend several solutions in instrument design and statistical analysis to account for variance introduced through measurement methods, of which this study employs the use of a common latent factor. Employing a common latent factor, as done in this study, allows measurement method variance to be controlled for without knowing its cause. The disadvantage is found along the same axis because choosing this option of controlling against method bias disallows the researcher from identifying the source of the measurement method bias. While choosing this method could open a critique to the reliability of the study, the study is designed to open up more research possibilities in precisely this manner.

In the final structural equation model for this confirmatory factor analysis (Fig. 4.5), the CFA introduced a latent variable that associates to each indicator variable remaining in the model. This factor was named “CLF" for "common latent factor." The CLF factor controls against variance introduced through measurement method (Podsakoff *et al.*, 2003). The process of introducing the CLF into the CFA model included a comparison test between a potential model that included a CLF against a model that did not include such a factor. A chi-squared difference test was conducted upon the two models resulting in a chi-squared difference score of 65.8, difference in degrees of freedom of 14, and significant difference measured between the two models ($p < 0.001$). As a result, this CFA retained the model that includes a CLF to control against bias arising from measurement method (Fig 4.5).

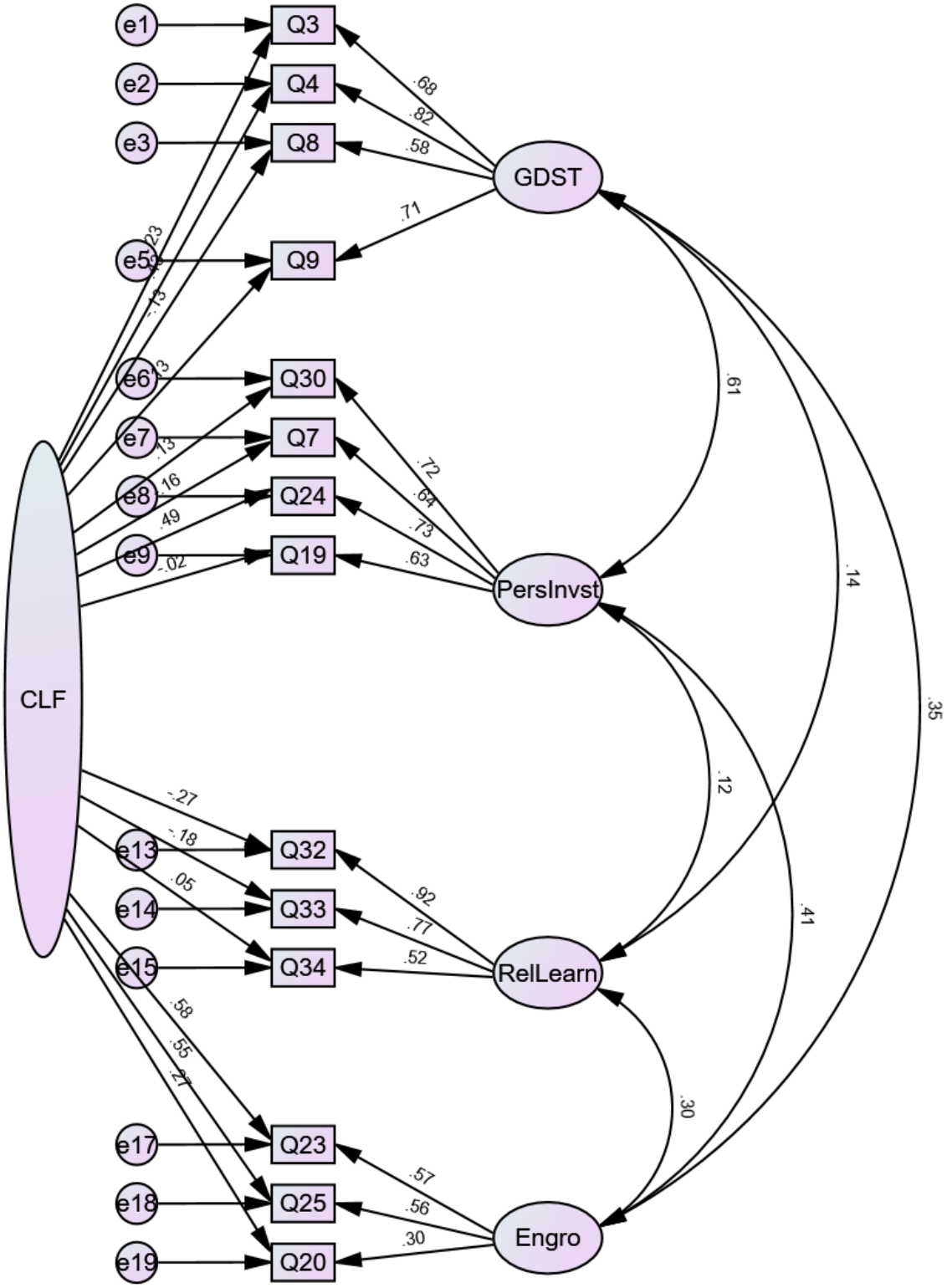


Figure 4.5 - Final CFA Model

Final Model Fit Indices

The majority of resulting final model fit scores fell within acceptable parameters (Table 4.16). This model underperforms in GFI score (0.933), which thresholds at 0.95. This study aimed for the threshold of 0.95, but accepted 0.933 as representing adequately good model fit (Hair *et al.*, 2013). This issue also highlights the importance of using a selection of fit indices to develop a robust set of model-fit measures.

Table 4.16 - Model-Fit Indices for Final CFA Model

Model-Fit Indices for Final CFA Model							
χ^2/df (< 3)	*p*-value of model ($p > 0.05$)	CFI (> 0.95)	GFI (> 0.95)	AGFI (> 0.80)	SRMR (< 0.09)	RMSEA (< 0.05)	PCLOSE (> 0.05)
1.309	0.059	0.973	0.933	0.881	0.0452	0.048	0.528

4.2.4.4 Confirmatory Factor Analysis Summary

This confirmatory factor analysis produced a model which shows correlations between indicator variables and four latent factor constructs. This model adjusts for error from measurement method bias and has an acceptable goodness of fit based on eight metrics for determining goodness of fit. Of additional note, both the *Engro* and *RelLearn* latent factor constructs class as "just-identified." Just-identified constructs have at least three indicator variables loading onto them. Just-identified constructs are acceptable, but having at least four indicators (considered over-identified) like *GDST* and *PersInvst* is ideal (Hair *et al.*, 2013). This completes the confirmatory factor analysis and the confirmed indicator variable questions associated with each factor appear in the tables below (Table 4.17 – Table 4.20).

Table 4.17 - CFA Factor 1 - Group Development (*GDST*)

CFA Factor 1 – Group Developmental Stages Theory (*GDST*)		
Item Number	Questionnaire Item Wording	Theory Used to Develop Item
Q3	"At some point during this activity, I began to understand how to complete the activity."	Forming in Task Dimension
Q4	"I began to see how my group members would relate to one another in this activity."	Forming in Relationship Dimension
Q8	"At some point during this activity, it seemed like my group improved in our ability to work together."	Norming in Task Dimension
Q9	"At some point during this activity, I viewed my role within the group as doing whatever was needed to help complete the activity."	Performing in Task Dimension

Table 4.18 - CFA Factor 2 - Personal Investment (*PersInvst*)

CFA Factor 2 – Personal Investment (*PersInvst*)		
Item Number	Questionnaire Item Wording	Theory Used to Develop Item
Q7	"At some point during this activity, I was able to share my ideas about how to complete the activity."	Norming in Relationship Dimension
Q19	"While engaged in the activity, I felt in control."	Flow related Control Perceptions
Q24	"While engaged in the activity, I felt fully involved."	Flow related Involvement
Q30	"I shared my ideas about how to accomplish the task with the group."	Mid-Liminoid related Relational Risk-Taking

Table 4.19 - CFA Factor 3 - Relational Learning (*RelLearn*)

CFA Factor 3 – Relational Learning (*RelLearn*)		
Item Number	Questionnaire Item Wording	Theory Used to Develop Item
Q32	"Something happened in this activity that caused me to think about how I treat others."	Post-Liminoid related Relational Learning and CDTT Bridge-building
Q33	"Something happened during this activity that caused me to think about how others treat me."	Post-Liminoid related Relational Learning and CDTT Bridge-building
Q34	"Having finished this activity, I found myself considering how I would work with future groups of people differently than before."	Post-Liminoid Relational Learning and CDTT Assimilation

Table 4.20 - CFA Factor 4 - Engrossed (*Engro*)

CFA Factor 4 – Engrossed (*Engro*)		
Item Number	Questionnaire Item Wording	Theory Used to Develop Item
Q23	"While engaged in the activity I forgot personal problems."	Flow related Forgetting of Personal Problems
Q25	"At some point during the activity, I began to think less about my daily concerns."	Pre-Liminoid Forgetting of Daily Concerns
Q20	"While engaged in the activity, I lost track of time."	Flow related Temporal Distortion

4.2.5 Causal Structural Equation Model

Following the successful production of confirmatory factor analysis structural equation model, this research developed a causal structural equation model to investigate possible influences which variables have upon each other.

4.2.5.1 Dataset Management

First, this research imputed new latent factor scales based on the CFA for each participant using SPSS. This imputation gave a new data point for each participant that associated with each latent factor in the model. These scores included corrections accounting for measurement method error. These scores needed inclusion into the dataset so that constructs could be represented in a casual SEM.

Outliers

This research also conducted a test for statistical outliers that could impact the regression weights of factor influences. This test, called the Cook's Distance test, measures regression weights in independent variables for each participant in relation to the new latent factor construct scales. A Cook's Distance score higher than 1 for any participant triggers suspicious treatment of a case (Parke, 2013). After conducting the Cook's Distance Test across three independent variables for each participant's latent factor scale data, no cases approached this threshold. The two independent variables used were *Unanimous* (the control or experiment criteria) and *Group Size*. Therefore, no outliers emerged as a result of the Cook's Distance Test.

Independent Variable *Unanimous*

Originally, this research set out to test statistical differences between two groups completing the Traffic Jam activity. Each iteration of the Traffic Jam activity was split into two halves, the experimental half receiving a requirement of unanimity to receive hints. The CFA SEM was split into two halves to conduct chi-squared difference tests upon the control

and experimental groups to consider whether the split models were significantly different. Unfortunately, model identification did not occur when splitting the sample into control and experimental groups. While an identified model is possible at a sample size of 137, the available degrees of freedom decrease when splitting the sample. A smaller sample size [control (n =72) and experimental (n =65)] permits fewer degrees of freedom. Degrees of freedom are necessary for estimating model parameters. Since this model includes four latent factor constructs and their connections to indicator variables, not enough degrees of freedom were available with the split sample sizes to identify a model (Hair *et al.*, 2013).

This research made iterative attempts to discover a model that maintained a four-factor solution where factors loaded with at least three variables each. Identification of any possible solution could not occur when splitting the sample. Further attempts attempted to identify a four-factor solution conceding an under-identified factor that loaded with only two indicator variables (Hair *et al.*, 2013). Even with these concessionary attempts, no identifiable solution emerged for both halves of the split sample. As a result, this research forewent splitting the group into subsamples.

This research pragmatically adapted the control or experimental grouping variable into an independent variable instead. As a reminder, the grouping intervention offered a brief discussion of MLGLS to a facilitator and importantly, required that facilitator to expect unanimity from their groups for hints. This measure will be considered an independent variable henceforth and is called *Unanimous* to summarize the construct represented by the intervention. This action will at least allow deliberations about the influence of the measure on the casual SEM.

MULTICOLLINEARITY

This research made another inquiry into the dataset for multicollinearity issues (Table 4.21). Correlations between latent factor constructs scoring above 0.7 (Hair *et al.*, 2013) may show initial indications of collinearity.

Table 4.21 - Latent Factor Construct Correlations

Latent Factor Construct Correlations	
Latent Factor Construct Correlations	Estimated Correlation
GDST <--> *PersInvst*	0.615
GDST <--> *RelLearn*	0.140
GDST <--> *Engro*	0.347
PersInvst <--> *RelLearn*	0.118
PersInvst <--> *Engro*	0.405
RelLearn <--> *Engro*	0.304

However, no such indications presented during this study. Uncorrelated latent factors are not enough to reject multicollinearity issues. Two additional tests inquire into possible issues of multicollinearity. Multicollinearity is the "…extent to which a variable can be explained by the other constructs in the analysis" (2013, p.2). Two dependent variables were compared against the new latent factor scales for collinearity tolerance scores and variance inflation factor (VIF) scores (Table 4.22). These two metrics are the reciprocals of one another. Tolerance scores shown higher than 0.100 for each latent factor are acceptable, while VIF scores should stay lower than 10. All scores collected in this study for tolerance and VIF met or exceeded criteria. This study therefore rejects multicollinearity issues in its model.

Table 4.22 - Multicollinearity Scores for Independent Variables to Latent Factor Constructs

Multicollinearity Scores for Independent Variables to Latent Factor Constructs		
Independent Variable Compared Against Latent Factors	Tolerance Scores	VIF Scores
Unanimous (Y/N)	0.882	1.134
Group Size	0.913	1.096

4.2.5.2 Hypotheses Revisited

A hypothesized causal model was offered at the beginning of the findings chapter to explore during EFA and CFA (Fig. 4.2). At this point, the four latent factors discovered through EFA and CFA appear exceedingly different in number and categorization than the hypothesized latent factors developed for the original hypothesis using a literature review. In the way of pragmatic exploration, a new hypothesized causal model is offered (Fig 4.6) instead of testing the original model. The differences between the originally and secondarily hypothesized models will be discussed in the analysis chapter.

Hypothesized Model Following CFA and EFA

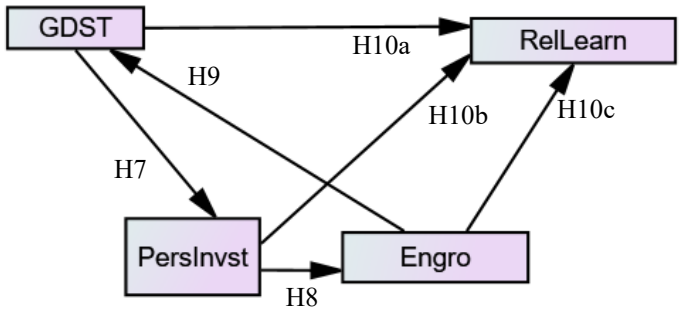


Figure 4.6 - Second Iteration Hypothesized Causal SEM

This new model takes the four latent factors and hypothesizes their possible connections (Table 4.23). *GDST* represents the latent factor collectively measured by Q3, Q4, Q8, and Q9. *GDST* continues to represent the developmental process that a group goes through. *PersInvst* derives from a subset of questions that speak to personal involvement (Q7, Q19, Q24, and Q30). This research first hypothesized that the developmental quality of a group influences a group member's personal investment (*PersInvst*; Hypothesis 7). The next construct represents engrossment (*Engro*), an intense focus on an activity that characterizes both flow and liminoid experiences (Q23, Q25, Q20; Turner, 1974; Csikszentmihalyi, 2014). This research hypothesizes that *PersInvst* influences *Engro* (H8) and *Engro* then cyclically influences *GDST* (H9). The final hypothesis relates to the final latent construct relational learning (*RelLearn*) measured with Q32, Q33, and Q34. All of these questions asked

participants to reflect upon relational issues. This study produces its final hypothesis that *GDST*, *PersInvst*, and *Engro* all interact to influence *RelLearn* (H10a, H10b, and H10c).

Additional hypotheses arise around mediation concepts. Mediation is "... a theoretical premise posit[ing] that an intervening variable is an indicative measure of the process through which an independent variable is thought to affect a dependent variable" (Iacobucci, 2008, p.2).

A nuance of H10 is that there are three paths included in this interaction. The first path is the direct influence received upon *RelLearn* by *GDST* (H10a). The second path represents the mediated relationship between *GDST* and *RelLearn* by *PersInvst* (H10b). The third path represents the mediation between *GDST* and *RelLearn* by both *PersInvst* and *Engro* (H10c). A final, additional mediation hypothesis is the path from *Engro* back to *GDST* which is mediated by *RelLearn* (H9). These are the influence paths which this causal structural equation model will test.

Table 4.23 - Second Iteration Hypotheses

Second Iteration CFA-Based Hypotheses	
Hypothesis 7	*GDST* influences → *PersInvst*
Hypothesis 8	*PersInvst* → *Engro*
Hypothesis 9	*Engro* → *GDST* (Cyclical Process mediated by *PersInvst*)
Hypothesis 10a	*GDST -> RelLearn*
Hypothesis 10b	*GDST -> PersInvst* → *RelLearn*
Hypothesis 10c	*GDST* → *PersInvst* → *Engro* → *RelLearn*

4.2.5.3 Exogenous Variables

Two exogenous variables needed an introduction into this path diagram. The initial and secondary hypotheses (following EFA and SEM) only included latent influences. Causal structural equation models also include influences from exogenous variables. Exogenous variables are predictor constructs which influence latent factor constructs [also called endogenous variables (Hair *et al*., 2013)]. The first exogenous variable represents the effect of unanimity on a group (*Unanimous*). The second exogenous variable represents the success

of a participant group. Each group was given a binary score on whether or not they succeeded at solving the Traffic Jam activity (failure =0, solution =1). The second exogenous variable was *Group Size,* which allowed exploration into the effects that the size of a group has on the model.

4.2.5.4 Initial causal SEM

An initial model for this causal SEM (Fig. 4.7) included the four endogenous variables and their associated error variables (e1, e2, e3, and e4) as well as the exogenous variables. Paths were drawn from each exogenous variable to every endogenous variable in order to explore all possible influences. Furthermore, endogenous variables underwent covariation (Hair *et al.*, 2013, Amos 26). This model produced a variety of data, including standardized path coefficients and model-fit scores. This research compared model fit scores against the same thresholds used throughout this study (Table 4.24). Additionally, this model produced path coefficients between variables. Path coefficients that were examined for their regression coefficient considering weak (0.02), moderate (0.13), and strong (0.26) regression coefficients (Cohen, Cohen, West, and Aiken, 2013). Weaker path regression coefficients were considered for exclusion. Moderate paths were maintained below the 0.26 threshold if they contributed to model fit.

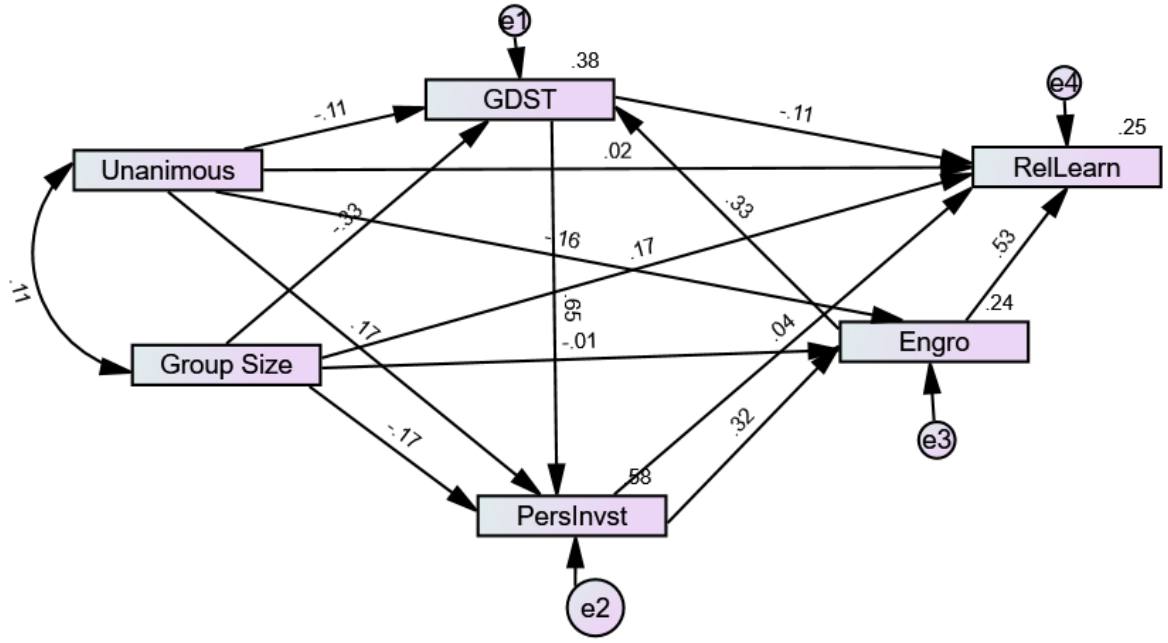


Figure 4.7 - Initial Causal SEM

Table 4.24 – Model-Fit Indices for Initial Causal SEM

Model-Fit Indices – Initial causal SEM							
χ^2/df (< 3)	*p*-value of model ($p > 0.05$)	CFI (> 0.95)	GFI (> 0.95)	AGFI (> 0.80)	SRMR (< 0.09)	RMSEA (< 0.05)	PCLOSE (> 0.05)
No Solution, df = 0	No Solution, df = 0	1.000			0.000	0.332	0.000

4.2.5.5 Final Causal SEM

The causal SEM was developed through an iterative process similar to the CFA SEM development process. This process removed underperforming paths to improve model fit and free-up degrees of freedom. The exogenous variable *Unanimous* was also treated for possible deletion; however, including it in the model resulted in a model that fit more closely to the data. Finally, a resulting model arose (Fig. 4.8) with corresponding goodness of fit scores (Table 4.25).

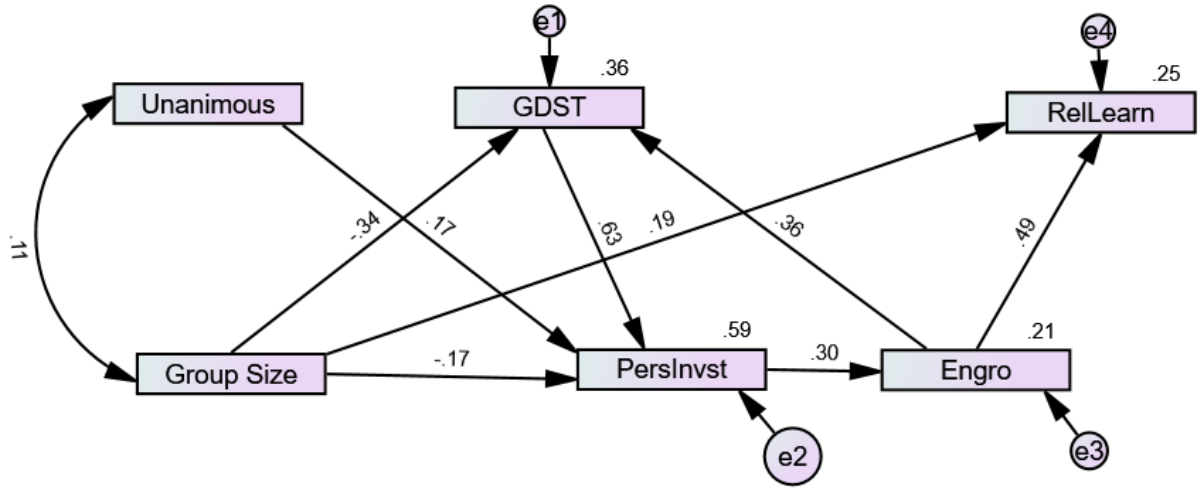


Figure 4.8 - Final Causal SEM

Table 4.25 - Model-Fit Indices - Final Causal SEM

Model-Fit Indices – Final Causal SEM							
χ^2/df (< 3)	*p*-value of model ($p > 0.05$)	CFI (> 0.95)	GFI (> 0.95)	AGFI (>. 080)	SRMR (< 0.09)	RMSEA (< 0.05)	PCLOSE (> 0.05)
1.356	0.228	0.991	0.980	0.932	0.0593	0.051	0.420

Every score fell within the goodness-of-fit parameters determined for this study except for RMSEA (0.051). This research accepts the slightly underperforming RMSEA score due to model falling within acceptable parameters for the other seven model fit indices. Additionally, some low path coefficients were retained in the final model despite low path coefficients because they all improved model fit. As a result, this causal SEM can facilitate mediation testing between variables.

Direct Effects

Direct effects are effect paths measured directly between two variables in the causal SEM. Paths are represented by an arrow and are labelled with a path coefficient in the causal SEM. In the tables, these path coefficients are represented with the character β to indicate that the regression weight is mathematically standardized with other scores in the model (Hair *et al*, 2013). The statistical significance of those paths is measured by first examining the standardized regression weights. Bootstrapping uses computer power to resample observed data to produce a larger sample size (Allen, 2017). By bootstrapping each path regression weight to 2,000 samples, a statistical significance of the path's regression can be extrapolated. Table 4.26 depicts the regression weight and the significance value discovered through bootstrapping 2000 samples for all eight paths in the model.

Table 4.26 - Causal SEM Direct Effects

Causal SEM Direct Effects		
Path	Regression Weight	*p*-value
Group Size → *GDST*	β=-0.338 (strong)	*p* =0.001
Unanimous → *PersInvst*	β=0.170 (moderate)	*p* =0.001
Group Size → *PersInvst*	β=-0.170 (moderate)	*p* =0.012
Engro → *RelLearn*	β=0.489 (strong)	*p* =0.001
Group Size → *RelLearn*	β=0.187 (moderate)	*p* =0.008
Engro → *GDST*	β=0.358 (strong)	*p* =0.001
PersInvst → *Engro*	β=0.302 (strong)	*p* =0.010
GDST → *PersInvst*	β=0.635 (strong)	*p* =0.002

Indirect Effects

This study also investigated for significant mediation between exogenous and endogenous various. Since this is an exploratory study, all the paths and possible mediation variables were tested for mediation effects using the final causal SEM. Out of the nine possible mediations in this causal SEM, all demonstrated statistical significance through bootstrapping. These nine effects investigated for mediation appear in Table 4.27.

Table 4.27 - Causal SEM Indirect Effects

Causal SEM Indirect Effects					
Initial Variable	Mediator Variable	Regression Weight	Outcome Variable	*p*-Value of Effect	Effect Statement
Unanimous	*PersInvst*	β=0.091	*Engro*	*p* =0.004	*PersInvst* mediates the positive effect of *Unanimous* on *Engro*.
Group Size	*PersInvst*	β= -0.019	*Engro*	*p* =0.012	*PersInvst* mediates the negative effect of *Group Size* on *Engro*.
Group Size	*GDST*	β= -0.122	*PersInvst*	*p* =0.001	*GDST* mediates the negative effect of *Group Size* on *PersInvst*.
GDST	*PersInvst*	β=0.123	*Engro*	*p* =0.008	*PersInvst* mediates the positive effect of *GDST* on *Engro*.
PersInvst	*Engro*	β=0.112	*GDST*	*p* =0.004	*Engro* mediates the positive effect between *PersInvst* and *GDST*
PersInvst	*Engro*	β=0.229	*RelLearn*	*p* =0.007	*Engro* mediates the positive effect between *PersInvst* and *RelLearn*
Engro	*GDST*	β=0.343	*PersInvst*	*p* =0.001	*GDST* mediates the positive effect between *Engro* and *PersInvst*

ENDOGENOUS VARIABLE STATISTICAL POWER TEST

The causal SEM not only produces correlation coefficients for direct and indirect effects, but also for the endogenous variables themselves. The endogenous variables were subjected to a further measure of scrutiny by considering their statistical power. Statistical power "…is the probability that statistical significance will be indicated if it is present" (Hair *et al.*, 2013). The statistical power test in this study investigates the possibility of discovering the significance of a regression coefficient associated with each endogenous variable given the sample size. Another reason for conducting this test relates to sample size issues. The sample size for this study (N =137), while adequate for EFA, could take scrutiny at this point in causal SEM (Hair *et al.*, 2013). Statistical power tests demonstrate the likelihood of finding a given effect given a regression weight in relation to the sample size. The endogenous variable coefficients were tested at a 95% confidence interval (*p* =0.05). The

results indicated that the chances of discovering each coefficient's statistical significance was %99.9 or greater (Table 4.28).

Table 4.28 - Causal SEM Construct Scores

Causal SEM Construct Scores			
Variable	Regression Coefficient	Significance *p* value	Statistical Power (99% confidence, *p* level =.005)
GDST	r^2 =.365	*p* =.002	1.0
PersInvst	r^2 =.592	*p* =.003	1.0
Engro	r^2 =.208	*p* =.008	0.999
RelLearn	r^2 =.252	*p* =.002	0.999

4.2.5.6 Hypotheses, Relevant Evidence, and Post-Hoc Tests

This findings chapter makes a final revisitation to the hypotheses associated with this study. Each hypothesis presented comes from the second set of hypotheses pragmatically produced as a result of the EFA and CFA conducted in this study. Further discussion about similarities between the original hypotheses (H1-H6) and the hypothesis offered here (H7-H10c) are developed in the analysis chapter. In this section, each hypothesis appears next to relevant evidence discovered in this explorative investigation (Table 4.30). This section also produces a tentative conclusion for discussion in the analysis chapter. Furthermore, three post-hoc tests were conducted for hypotheses 10a,10b, and 10c to produce relevant evidence for consideration (Table 4.29).

Table 4.29 - Post-Hoc Statistical Tests

Post-Hoc Statistical Tests	
	Statistical Significance
GDST direct effect → *RelLearn*	*p* =0.328
PersInvst mediates the effect of *GDST* on *RelLearn*	*p* =0.858
PersInvst mediates the effect of *GDST* on *Engro*	*p* =0.858

Table 4.30 - Final Quantitative Hypotheses Report

Final Quantitative Hypotheses Report		
Hypothesis	Relevant Evidence	Conclusion
Hypothesis 7 (H7) *GDST* influences → *PersInvst*	*GDST* directly influences → *PersInvst* with a strong (β =0.635) regression weight (*p* =0.002).	Group development indicates a supportable direct effect on one's personal investment.
Hypothesis 8 (H8) *PersInvst* →*Engro*	*PersInvst* directly influences → *Engro* with a strong (β =0.302) regression weight (*p* =0.010)	Personal investment indicates a supportable direct effect on one's sense of engrossment in an activity.
Hypothesis 9 (H9) *Engro* → *GDST* (Cyclical Process mediated by)	*Engro* directly influences → *GDST* with strong (β =0.358) *PersInvst* regression weight (*p* =.002)	Engrossment indicates a supportable direct effect on group development. Combined with H7 and H8, there is a cyclic direct effect between group development, personal investment, and engrossment.
	Engro' influence → on *PersInvst* is strongly mediated (β =0.343) by *GDST* (*p* =0.001).	Engrossment's influence in the cyclic loop on personal investment is mediated by group development.
	GDST's influence → on *Engro* is weakly mediated (β =0.123) by *PersInvst* (*p* =0.008)	Group development's influence on a person's engrossment is mediated by a person's personal investment.
	PersInvst's influence → on GDST is weakly mediated (β =0.112) by *Engro* (*p* =0.004)	The influence of a person's personal investment on group development is weakly mediated by their engrossment.
Hypothesis 10a (H10a) *GDST* → *RelLearn*	*GDST* has no statistically significant effect on *RelLearn* (*p* =0.328)	Group development does not influence relational learning.
Hypothesis 10b (H10b) *GDST* → *PersInvst* → *RelLearn*	*PersInvst* mediates no statistically significant effect from *GDST* on *RelLearn* (*p* =0.858)	Personal investment does not influence any effect from group development onto relational learning.
Hypothesis 10c (H10c) *GDST* → *PersInvst* → *Engro* → *RelLearn*	*PersInvst* mediates no statistically significant effect from *GDST* on *Engro* (*p* = 0.858). *Engro* mediates a moderate (β =0.229) effect from *PersInvst* on *RelLearn* (*p* =0.007)	Personal investment does not influence any effect from group development onto engrossment; however, engrossment does mediate an indirect effect personal investment has on relational learning

4.2.6 Summary of Quantitative Findings

This study conducted exploratory factor analysis with screened data produced by a sample (N=137) through a novel 36-item questionnaire. These 36 questionnaire items hypothesized 19 indicator variables loading onto four latent factor constructs (*GDST*, *PersInvst*, *Engro*, and *RelLearn*). A confirmatory factor analysis tested the hypothesized correlations between these 19 indicator variables and four latent factors, supporting 14 indicator variables and their respective loadings. These 14 indicator variables and four latent factors rendered visually into a CFA structural equation model. The CFA SEM then helped develop a causal SEM. The causal SEM facilitated the exploration of direct and indirect relationships between endogenous and exogenous variables. Following the CFA, this study hypothesized about the causal relationships between latent factor constructs. The causal SEM development tested these hypotheses.

4.3 Qualitative Findings

The qualitative side of this mixed-methods research project explores the experience of participants in an experiment designed to test the modulated limonoid group learning synthesis (MLGLS). This research selected the Traffic Jam activity as the activity that facilitated MLGLS. This study sampled cases of participants previously connected through an organization, so participants knew each other on some level. Each case completed two separate iterations of Traffic Jam. These qualitative findings continue to refer to the two iterations of Traffic Jam as the control and experimental activities (also referred to as "case-halves") to maintain continuity with the quantitative section. This section refers to the entire collection of t participants within a sample as the case. Data gathering in the Traffic Jam activity happened through five methods: a researcher journal, video recordings of two Traffic Jam activities per case, video recordings of all case participants in one debrief, open-ended questionnaires, and follow-up emails. This section compares observational narratives for six

case-halves who completed the Traffic Jam activity, producing common narrative elements and overarching narrative processes for those observational narratives. Those six observational narratives came from three cases: upon those same three cases, a thematic analysis was conducted. The thematic analysis for three cases is compared to produce meta-themes across all the cases. At the end of this qualitative findings section, overarching narrative processes and meta themes are compared to blend the final findings of the qualitative section of Chapter 4.

4.3.1 Data Management

4.3.1.1 Raw Data

This research collected several forms of raw data throughout the study. The first type of raw data came in the form of a research journal. The researcher made brief journal entries following each case to remember situation details and personal sentiments surrounding the activity. Next, high definition cameras collected raw video recordings of two iterations of the Traffic Jam activity per case. High definition cameras also recorded one debrief that included all participants, facilitators, and gatekeepers associated with the case. Additionally, participants produced narrative response data by answering nine open-ended questionnaire questions following the Traffic Jam activity. Finally, some participants produced narrative responses to a follow-up email sent three weeks following each activity.

Raw Data Transformation

Taking raw data and rendering it in a way that was useful for developing a rich description of each case study required different measures for each type of data. Before using methods to make data useful, the qualitative researcher must remember the importance of accurately portraying the lived experiences of participants (Charmaz, 2014). If the researcher is the instrument through which qualitative research is conducted (Marshall and Rossman, 2016), they must commit to making every effort to set their agenda aside to share the real,

lived experiences of participants and their experiences (Creswell, 2014). If the research project observes this caveat, it may proceed in interpreting raw data and making analytical decisions with it.

Journal Entries

The first type of raw data exhibited in this research was the researcher journal. The researcher made short, informal journal entries following each activity (Creswell, 2014). These journal entries recorded the sentiments of the researcher following an activity. They also aided in the recall process when building a description of each case. Journal entry quotes were incorporated into the case observation narratives used in the qualitative aspect of this study.

Video Recorded Activities

Each case group was divided into two halves and participated in an initiative called Traffic Jam. The researcher observed each video recording and produced a narrative account of each recorded activity (Salkind, 2010). This step resulted in six narrative accounts: two narrative observations for each of the three cases in this study. These narratives then underwent triangulation with narrative transcriptions of video recorded debriefs, questionnaire responses, and three-week follow-up emails. Participants shared considerable amounts of observational data in their debriefs and questionnaire responses. Triangulating researcher observations and participant observations allowed for two data sources to confirm or confound one another, resulting in a more trustworthy narrative account.

Video Recorded Debriefs

One video recorded debrief was taken for each case resulting in three videos (Salkind, 2010). This research developed a protocol of questions to use with each case (Creswell, 2014). Using a protocol of questions makes the debrief a semi-structured interview (Given, 2008); however, the group retained the freedom to change topics or not answer the research

questions. The researcher always asked two specific questions in the debriefs, while additional questions changed depending on the case. The first question asked about the participant's experience in the activity. The second question asked participants how they would relate this activity to their daily lives concerning their context. The first debrief question replicates the research question and allows for a highly open-ended expression of a participants' experience. The second question derived from one of the theories which the experiment tests: CDTT. Question two was based on the realization that group dynamics exercises (and most experiences) are generally less salient if participants cannot relate an activity back into their daily experience (Schenck and Cruickshank, 2015). These questions were the central questions in the debrief, but a conversational tone in the debrief meant that further, unique questions would always arise.

Each video recorded debrief underwent transcription to text format. Computer software from Otter.ai (Otter Voice Meeting Notes, 2020) was used to create the initial transcript. This transcript was then checked against the video recording to develop a transcript that matched the video recording as closely as possible. A challenge to this approach was poor microphone pick-up, which occasionally resulted in lost words or phrases. This process recognized that "transcription is a form of *representation...*" but it is also a "… kind of shorthand version of the data that is more practical to work with than the data itself." (Gibson and Brown, 2009, p.109, 111). Transcription proves helpful for research since raw video recordings cannot easily be incorporated into a written thesis such as this.

Video recorded debrief transcripts were used in two ways. First, they were used to confirm and confront the observational account of the researcher to produce triangulated accounts of the two Traffic Jam activities for each case. Second, they were used in triangulation with questionnaire responses and three-week follow-up email responses to produce coded, thematic analyses of each case.

Questionnaire Responses

Questionnaire responses came from open-ended questions (Table 4.31) on the questionnaire designed for this study (Appendix C). Qualitative questions always asked for open-ended elaboration following quantitative scale questions. This research backed these quantitative scale questions with theory from the literature review. Table 4.31 lists those quantitative scale questions as well as the theory used to develop them. The elaborative qualitative questions that collected open-ended narrative responses appear below each quantitative question. Qualitative questions have a label including the letter "a" following their name.

The qualitative questions leave interpretational room for the respondent. These broadly worded questions resulted from a pilot test with undergraduate university students in the United Kingdom. Initially, the questionnaire included very focused qualitative questions, but these did not connect with respondents because they were too narrow. The questions underwent changes to allow for a broader range of responses. This decision resulted in responses that sometimes related to the questions and other times had seemingly little to do with the questions. This sometimes-necessitated interpretational handling of open-ended responses. The researcher had to examine whether a response related to the question. Sometimes it seemed as though participants were expressing something important to them that didn't fit any question. Responses to the questionnaire confirmed and confronted researcher observations of the two Traffic Jam activities for every case. This process provided a more robust account of each Traffic Jam activity. Additionally, questionnaire responses triangulated with transcribed debriefs and three-week follow-up email responses in a coded, thematic analysis.

Table 4.31 - Qualitative Questionnaire Items

Qualitative Questionnaire Items (Note: Qualitative questions are identified with an "a" following the item number.)		
Question Item	Deductive Theory Used to Produce Questionnaire Item	Question Wording
Q12	Adjourning/Relationship	As a result of this activity, my attitude toward one or more people in my group has changed, for better or worse.
Q12a		If you're able, please explain your answer
Q26	Pre-Liminoid/Relational Uncertainty	At some point during the activity, I began to notice others were uncertain about how to interact with each other.)
Q26a		If you're able, please write what happened in your group that made it clear that others were uncertain about how to interact with each other.
Q27	Mid-Liminoid/Stall	At some point during this activity, our group progress stalled
Q27a		If you are able, please write what happened in your group that made it clear you group progress was stalling.
Q29	Mid-Liminoid/Relational Learning	As a result of this activity, I feel like I learned something about some or all members of the group.
Q29a		If you're able, please share something(s) you learned about a member or members of your group.
Q31	Mid-Liminoid/Relational Sharing Fear	At some point during this activity, whether I shared or not, I was uncertain how others in the group would respond to me.)
Q31a		If you're able, please share any factors that caused you to feel uncertain about how others would respond to you. If you felt no uncertainty, please explain why.
Q32	Post-Liminoid/Relational Learning/CDTT/Bridge-building	Something happened in this activity that caused me to think about how I treat others.)
Q32a		If you're able, please share any factors that caused you to feel uncertain about how others would respond to you. If you felt no uncertainty, please explain why.
Q33	Post-Liminoid/Relational Learning/CDTT/Bridge-building	(Something happened during this activity that caused me to think about how others treat me.
Q33a		Please describe anything that happened during this activity that caused you to reconsider how others treat you. If possible, please explain your answer.
Q34	Post-Liminoid/Relational Learning/CDTT/Assimilation	Having finished this activity, I found myself considering how I would work with future groups of people differently than before.)
Q34a		If possible, please describe anything you learned as a result of today's activity that made you desire to adjust your own actions in future groups.
Q38	CDTT/Bridge-building	I saw some connection(s) between this group activity and other group activities in which I have participated in the past.)
Q38a		If possible, please explain your answer.

Three-Week Follow-Up Emails

The final type of raw data came from emails sent after the activity. Emails to participants went out up to three weeks following an activity. One question in the email asked, "Have you thought at all about the group activity experiment you took part in on (date here)? If so, what reflections did you make, or thoughts did you have? If not, please leave me a line saying so." Responses to this measure were admittedly low, but not non-existent. Collected responses were triangulated with transcribed debriefs and questionnaire responses to produce narrative observation accounts and a coded, thematic analysis of each case.

4.3.1.2 Higher Level Qualitative Data Handling

Triangulation

Throughout the previous section describing methods of handling the five types of raw data, the term triangulation appeared. Triangulation happens when a study collects data with more than one method and then interprets it together as a single unit (Flick, 2007). Triangulation helps the researcher to overcome a lack of multi-researcher interpretation (Denzin, 1970; Flick, 2007). It also produces a more robust description of an observed unit and ultimately supports the credibility of qualitative research (Creswell, 2014).

In this particular study, triangulation produced three groupings of data. The first and second groupings resulted in observational, narrative accounts of the control and experimental halves of each case. These case halves completed separate iterations of Traffic Jam. This research triangulated researcher observations, transcribed participant debrief comments, and narrative questionnaire responses to produce these narrative accounts. Again, this qualitative section uses the terms "control" and "experimental" to maintain continuity with the quantitative aspect of this research. These terms do not indicate analytical intentions toward the effect of a deductive intervention. Using triangulated data to develop these two

activity accounts combats single-observer bias. These findings present two triangulated observational narrative passages to represent each case-half explored in this study.

Coding and Thematic Analysis

This research project triangulates the third type of data. This group of data arises from a video recorded debrief transcript, participant responses to questionnaires, and three-week follow-up emails. This grouping of triangulated data allowed a different kind of analysis. Instead of offering a narrative event description like the observational account, this data was coded and used for thematic analysis. Coding and thematic analysis work by assigning codes to narrative statements. Codes should represent the summative meaning behind a statement, and some recommend the best practice of rendering them as gerunds (Charmaz, 2014). A researcher then organizes codes according to common themes: similarities of meanings (Mills *et al.*, 2010; Charmaz, 2014; King and Brooks, 2018). The coding and theming process for this research utilized computer software (NVivo 12). When themes emerged from codes, it gave the researcher insight into more and less common ideas that arose in the narrative data. Criticisms come from positivist and interpretivist camps about thematic analysis, but thematic analysis is a widely accepted method of conducting case study research (Mills *et al.*, 2010; King and Brooks, 2018). Therefore, this research employed thematic analysis to explore participants' experiences in each case.

Comparative Case Studies

With three different types of triangulated data, this research employed four layers of comparison to confirm and confront findings with each case. Mills *et al.* offer this definition of comparative case study:

> The comparative case study examines in rich detail the context and features of two or more instances of specific phenomena. This form of case study still strives for the "thick description" common in single case studies; however, the goal of comparative

> case studies is to discover contrasts, similarities, or patterns across the cases. These discoveries may in turn contribute to the development or the confirmation of theory. (2010, p.174).

This research developed these rich descriptions of each case in order to use them for comparative ends. When comparison occurred across case studies, the researcher sifted through the differences, similarities, and recurrences between cases. So, this research first built a rich description of each of the three cases comparing two activity observations and a thematic analysis to represent each case. Each case was then compared to the other two to identify areas of similarity, differences, and patterns.

First, the case comparison process compares two activity narratives from each case half: one for a control group and the other for an experimental group. These two narratives were rich, robust accounts supported through multiple observational sources. These accounts needed further adjustment because large narrative accounts do not make easily comparable units for research. Therefore, the narratives were rendered in a way that made comparative analysis possible (Yin, 1981). Next, this research condensed longer narrative accounts by summarizing them into a dense, one-paragraph vignette. These vignettes were intended to capture the essence of the activity, packing in the crucial details from each narrative (Yin, 1981). The decision to represent longer narratives as concise vignettes instead of codes followed best practice in qualitative research. This best practice suggests using narrative data and coded data together to form a case (Yin, 1981; Creswell, 2014). Since coded data are developed elsewhere in this study, these long narratives summarize into vignettes. Additionally, the vignettes were not blended because each of the two activities within a case represented different experiences. Blending the entire group's experience occurs through the coding process and thematic analysis. Each case was be represented by two vignettes as well as coded data.

The second stage of comparison begins with the coding process and thematic analysis. The triangulated data for this process comes from the entire case because the debrief included all participants from a case. The themes that emerge through the coding process (Charmaz, 2014) were place alongside the two observational vignettes. Qualitative best practices recommend the pairing of narrative observation and coded themes (Yin, 1981; Creswell, 2014) The two vignette paragraphs and the thematic analysis represented each case.

The third level of comparison occurred by comparing three complete cases (two vignettes, one thematic analysis each), called comparative case study. This research employed convenience sampling across three different countries: The United Kingdom (U.K.), the United States of America (U.S.A), and Hong Kong (H.K.). Comparing three cases from three different countries introduces diversity into the comparison. These cases are three, technically different experiments, (Mills *et al.*, 2010), so comparing them increased credibility. Comparative case study across three, cross-cultural samples addresses bias introduced through purposive sampling. It also addresses single-observer bias because the single researcher has to reconcile evidence from multiple cases. This step produced a refined expression of similarities, differences, and patterns across different cases.

The fourth step of comparison moved beyond the qualitative aspect of this study and is further addressed in the mixed-methods analysis chapter. Still, taking qualitative findings and analysis into a mixed-methods analysis adds another level of credibility to the study. A mixed-methods analysis of the qualitative findings served as the final level of comparative-checking used in this study to increase the credibility of the study and mitigate researcher bias.

4.3.2 Case Study Findings

4.3.2.1 United Kingdom Case Findings

United Kingdom Case Demographics

The first case study this research explored came from a group of church leaders in Northwest England. These church leaders were in charge of leading smaller groups in their church and wanted to be an inviting presence to give hope to people in their community. Included in this group were some people who had additional leadership responsibilities over the entire church (referred to as organizational leaders). A total of 24 of these church leaders participated in the Traffic Jam activity. Two facilitators, Megan and Ethan, volunteered to lead the two teams that resulted from randomly dividing the remaining 22 people into two groups of 11. Megan self-reported over ten years of leadership experience while Ethan self-reported 5-7 years of experience. The case included men and women aged 21 to 46. Those who participated had English, Northern Irish, German, or South African national backgrounds. The activity took place on a Sunday evening at the participant's' church and in two large, separate rooms. The debrief itself took place as one discussion with all 24 participants. The entire experimental activity was conducted as a leadership training seminar. Participants expected to discuss implications for leading their small house groups, which met weekly as an additional aspect of the church's routine function.

Researcher Journal on United Kingdom Case

Following this activity, I shared some sentiments about this iteration of the study. I wrote in my journal that "… this experiment iteration was really exciting and showed that bigger groups can successfully complete the activity." This group was the tenth case I had observed throughout the duration of this experiment. It was also the largest sample I had gathered to that point. I wondered if the larger sample size would affect the difficulty of the activity.

I also wrote, “The transference discussion was really poignant." I think I was moved by how much the participants wanted to discuss their context. They were very invested. To that point, I wrote, "The experiment was conducted from 7:00 p.m. until about 10:00 p.m. I felt tired, but everyone else seemed really engaged." Despite the evening meeting time where I would usually have begun winding down, this group showed vigour in their participation and especially in the debrief. If anyone was unhappy about this meeting time, I would never have guessed it.

This group was also one of the more connected groups with whom I interacted. Following the activity, I wrote, "I think these were mid-level church leaders who all seemed to know each other very well. Their interaction was much closer than that of the more random collection of those in the previous experiment who were from the same church." The week prior, I worked with a group of participants from the church who answered a general call for participants. While it is beyond the scope of this study to address differences between those two groups, my reflection at the time illustrates the closeness of these small group church leaders.

I also made a note about the different strata of leadership within this group of leaders. I noted that “This was a mixed group of mid-level leaders with one or two more senior members." I didn't seem to have thoughts beyond this observation, but I thought it important to make the notation. While everyone in the meeting was a leader in the church, some higher-level leaders participated as well. In speaking of higher-level leaders, I at least noted a pastor was present as well as the person who leads the ministry to children.

Finally, I wrote about the feedback I received. I wrote, “I received feedback from participants that they found it very helpful.” I distinctly remember that at least a quarter of the participants spoke to me and shared genuine expressions of some sort of value they experienced in the activity. These were the sorts of reflective comments that I wish I could

have captured better during the study. I further recorded that it was "…some of the most positive feedback I received during the entire experiment." This feedback was so positive that I noted it to be some of the best I had experienced from participants in all ten iterations of the experiment that I had conducted thus far.

Observation Narratives of Video Recorded Activities for United Kingdom Case

These video-recorded activity observations are presented in a narrative style. Hopefully, they read like a novel where researcher observation and participant observation weave together to create a storied account of a group's Traffic Jam experience. The first activity's narrative is much longer than the others because it takes the time to parse out the sequential moves that the group made as they attempted to solve Traffic Jam. The moves in that narrative were used as types and subsequent narratives refer back to it. Appendix D presents the solution sequence for the Traffic Jam activity.

United Kingdom Control Group Case-Half Observation Narrative

As participants entered the room, the facilitator, Megan, spoke up and described Traffic Jam as a "game, or … a logic puzzle really." Megan immediately divided the facilitated group into two teams. She asked everyone to stand on a square, leaving one empty square in the middle with the two teams facing each other (Fig. 4.9). Once everyone stood in

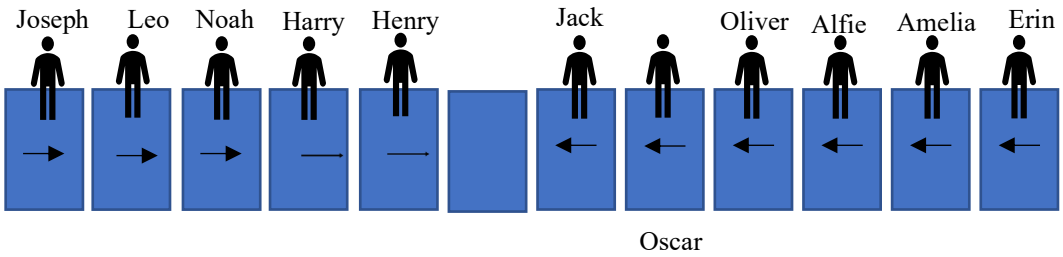


Figure 4.9 - U.K. Control Case Half Starting Positions

their correct position, she immediately shared the aim of the game: to swap sides. Finally, Megan explained the rules of Traffic Jam to the group. In addition to her explanation, she asked group members to demonstrate the rules of movement in the activity physically.

During this demonstrated instruction time, several group members asked clarifying questions, usually about the rules. Henry asked an example of a clarifying question.

Henry asks, "Are we working together, or are we against them?" He is wondering if the two group halves in Traffic Jam are competing or working collectively.

Megan says, "I'd say together" with an interpretive inflection. During this time of instruction and clarification, other group members were chatting separately, half-engaged in the explanation, and half-engaged in socializing. The mood of this time was light-hearted. Megan picks up on this lighter mood and suggests someone take charge because of all the chatting.

Of note, a participant in this case half named Joseph participated in the activity earlier in the month. Prior to Traffic Jam's start, the researcher asked that he remain quiet during the activity. The researcher promised that Joseph would be allowed to share his experience later in the activity. Shortly after the start, the researcher discovered another experienced participant named Amelia, who had done Traffic Jam before. While the demographic screening questionnaire included an item that intended to discover those who had experience at Traffic Jam, it was not always successful. Some participants only realized they had done this game before once it started because they had done it under a different activity name. I asked Amelia if she had chosen not to speak in line with my desire to keep experienced participants quiet. She confirmed that she had done so.

Oliver responded to this silencing measure by exclaiming, "Oh my goodness, they're dropping like flies!" The group affirmed this sentiment with nervous laughter. The researcher reassured the group that he would return at a certain point and allow the experienced participants to speak.

Despite the reassurances from the researcher, Oscar shares that "There were unusual leadership dynamics and a number of members were unable to take or give advice. Knowing

that three people knew the answer and could not communicate was a little tricky and caused us to second guess our communication strategy." This decision affected how Oscar saw the group. Interestingly, Oscar thought that three people were unable to share and not just two.

Another important observation was that there were only two women in the group. They both gravitated to the far-right side. One of the women, Amelia, was silenced for reasons of prior experience with the activity. The other woman, Erin, took a physical stance just to the left of her square to give herself a view of the entire group. While the group was facilitated by a woman and had two women participants in it, the group was comprised mainly of men: counting nine.

The group began as instructed by Megan, setting up on two sides with a blank square in the centre. (Fig. 4.10)

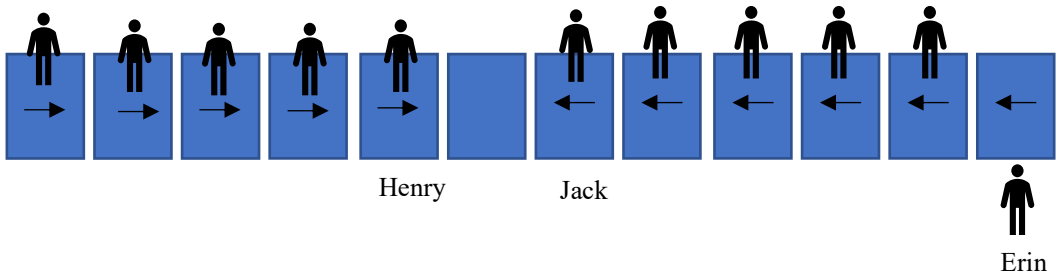


Figure 4.10 - CONTROL GROUP STARTING POSITIONS

Erin, stood at the far right, and suggested that Henry take a step forward into the empty space in front of him (Fig. 4.11). There is some discussion about whether it should be Henry or Jack because the numbers on the two sides of the activity are different. In the end, everyone supported the suggestion that Erin made for Henry to move forward (Fig. 4.11).

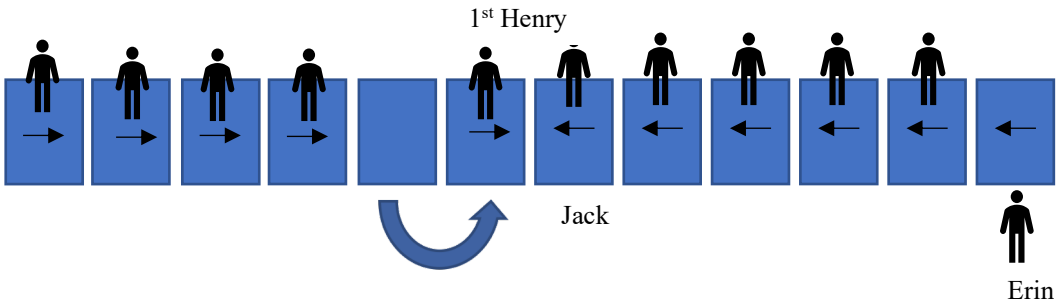


Figure 4.11- CONTROL GROUP, FIRST MOVE

Next, Jack stepped around Henry, and Henry filled the space that Jack just emptied. This movement was key because Traffic Jam often opens with this sequence, and it results in guaranteed failure (Fig. 4.12). If Henry did not fill the empty space, success would have still been possible (Fig. 4.14). The positioning depicted in Figure 4.12 is both legal and leaves the

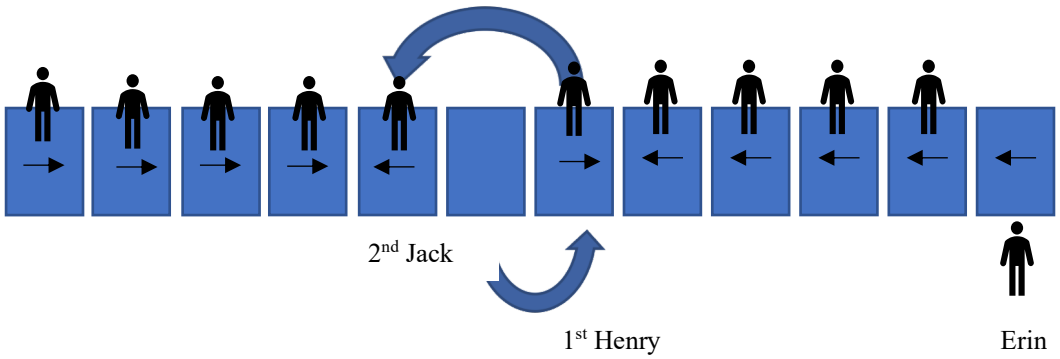


Figure 4.12 - CONTROL GROUP ENTERS FAILURE SCENARIO IMMEDIATELY

option for further legal moves; however, the group will eventually run out of legal moves and have to reset. No success is possible with this set-up.

The group worked its way through a few more legal moves before running out of legal moves. Harry moved around Jack, and Jack continued forward into the empty space that Harry left (Fig. 4.13). Notice the pattern of leaving the empty space between two people who are facing away from each other. This pattern always indicates that the group will run out of legal moves and require a reset. Also, notice that Harry is facing Henry's back. Anytime two people ended up facing the same direction in two subsequent squares with people ahead of

them still facing them, it was a guarantee that the group would eventually run out of legal moves and require a reset.

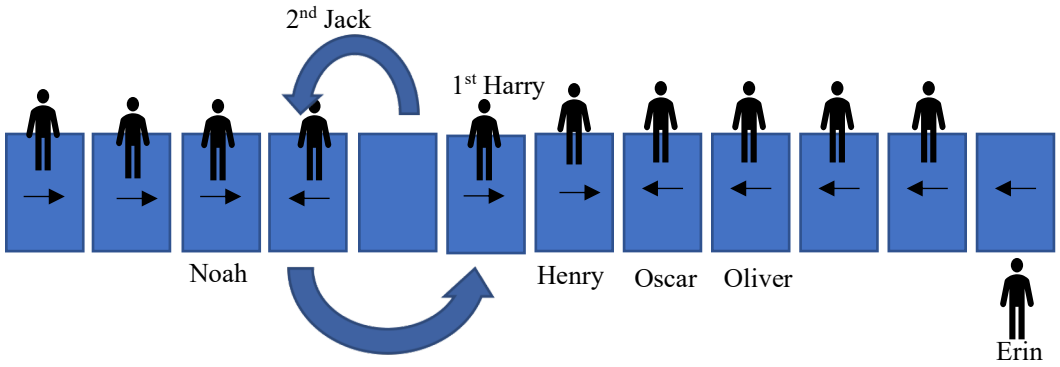


Figure 4.13 - Control Group Continues Making Legal Moves Despite Having Triggered the Initial Failure Scenario (Figure 4.12)

The group continued for one more move in this sequence. They realized that they would fail before experiencing the failure by running out of legal moves. The mood of conversation had shifted at this point as well. Some people still seemed light-hearted and joking, while others were taking the activity very seriously. Many participants offered directions and talked over each other while doing so. Oscar remarked on this dynamic writing, "There were so many viewpoints being expressed at once."

Noah made an attempt to take charge of the group by giving directions louder than everyone else while Erin was still calling directions at the far end. Megan reminded the group that they could reset whenever they like, and eventually, Oscar seconds the motion after saying, "None of us can move." The group chooses to reset back to their starting positions.

At this point, Megan said, "I think part of the rules is that I'm also involved, so in that context, I have to say the reset just so I know what everyone is up to." Megan asserted her role as a facilitator while maintaining a sense of interaction with the group in that statement.

It was handled tactfully, so Oscar then respectfully yet jokingly requested Megan's permission to reset.

Oliver comes in and joked, "You've been aced!" which elicited laughter from the group. The next attempt involved some short-lived success before requiring another reset. The group resets and started off in the correct pattern with Henry moving forward into the empty space and Jack moving around him (Fig. 4.14)

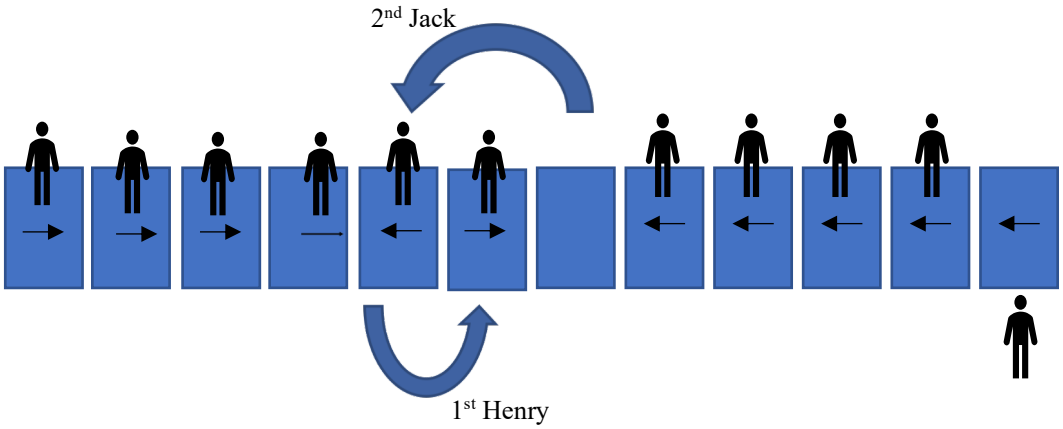


Figure 4.14 - Control Group, Second Attempt, Correct 1st and 2nd Moves

Oscar then moved into the empty space, and Henry went around him as well. So far, this sequence was correct. No two people were facing the same direction after they have moved, and the sequence where two people were facing away from each other with the space in the middle had not occurred. This sequence typically indicates success: Oscar was facing a blank space and ahead of the blank space was Jack, who is facing away from Oscar. This positioning was a good sign (Fig.4.15).

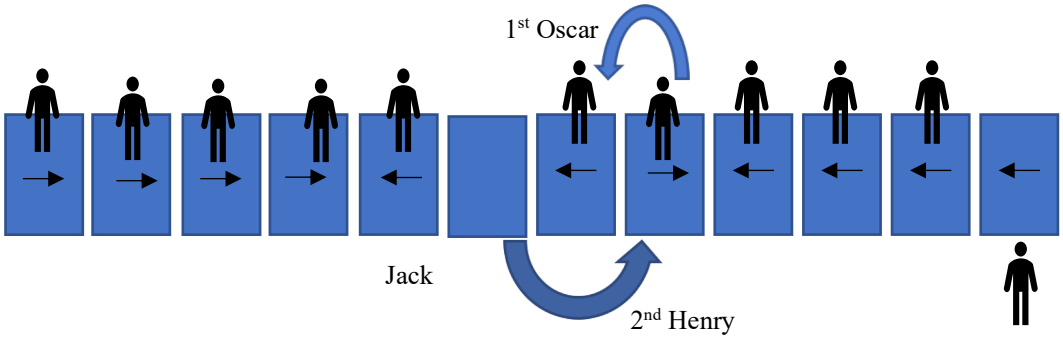


Figure 4.15 - Control Group, Second Attempt, Continuing Correct Sequence

After that progress, the group failed. They must reset again because Harry moved around Jack, and then Jack filled the empty space that Harry left. This movement resulted in the positioning that indicated impending failure: Jack was facing away from Harry with an empty space in between them (Fig. 4.16). During these attempts, Erin had been offering directions from the back. While offering her input, Noah heckled Erin. He says, "Are you sure?" with a joking tone after Erin called out a direction.

At the same time, the researcher happened to be in the room. A participant asked whether moves backward were allowed. The researcher said that a move backward was an illegal move, and the group should reset if this had taken place. They did so. Henry reflected on these initial resets by saying, “For the first few minutes we kept making the same mistakes over and over again, so that we didn’t really learn from what we were doing.”

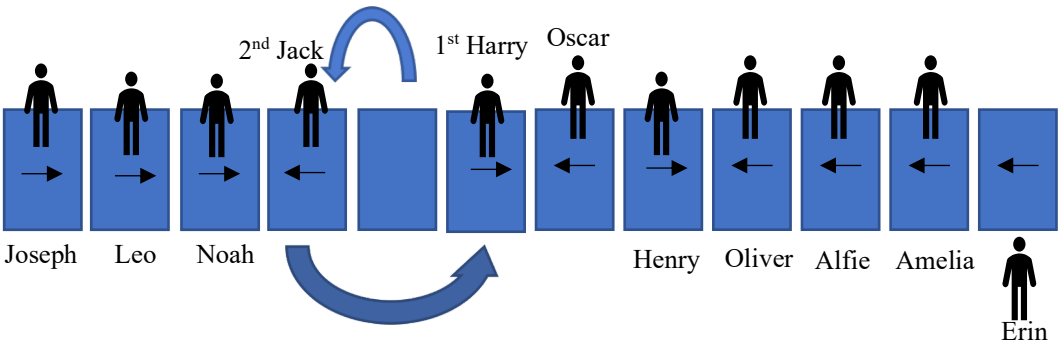


Figure 4.16 - Control Group, Second Attempt, Entering into Late-Occurring Failure Scenario

watching altogether. So it is getting muddled up. So…” she trailed off. Most of the group was

paying attention to her now. She picked back up: “You know what it was: one person didn’t make the decision. So like, I want one voice. If you had one voice instead of everyone speaking." This moment illustrated an important aspect of the activity's design. The facilitators did not know the solution to Traffic Jam, only the rules and the hints. Here Megan offered assistance to her group, but she did not know how to solve it beyond knowing the legal moves.

After a pause Noah announced, “Okay so we nominate Henry!” Harry and Erin immediately affirmed this decision. Erin and Leo even clap once in an affirmatory manner. Megan comments upon this decision saying, “The math whiz” presumably affirming a strength of Henry’s. Upon Henry's nomination as the leader, Megan offered the first hint. Megan told Henry that he could step out to get a better look at the group. Erin had already been doing that for quite some time. Henry took Megan up on the opportunity and studied the group intently, making hand motions as he thought. These hand motions received a great deal of light-hearted joking and laughter from many in the group. Henry suggested a possible method to solve the problem, but the group correctly reasoned that it would not work. Without offering further suggestions, Henry returned to the line.

At this point, two attempts were made which ended up in reset. Importantly, the group really factures in their conversation here. Erin began having a conversation with Amelia and Megan. Oscar, Jack, Henry, and Harry all worked together in the middle with the empty space. Noah says, “One voice then, one people, one voice” over everyone in the midst of several disjointed conversations. Joseph and Leo were having their own conversation on the far-left end of the line.

During the debrief, Oliver shared about this first phase of the activity. He said, '… it was a bit chaotic at first…" He followed by attributing the chaos to "everyone trying to contribute." In his questionnaire, he remarked, "I was surprised that some people were less

focused on the task than everyone else was." He also noted, "We [the group] kept having failed attempts, and there wasn't clear communication between the group. [With] some members [who] worked well and logically whilst others didn't focus fully." Oliver reflected on the stall saying, “[it] made me think that its best to listen to others to the benefit of yourself and what you're doing." This moment appears to have been thought-provoking for Oliver.

Harry also noticed a lack of focus. In the debrief, he said, “There was a moment between about fifteen minutes and eighteen minutes, people started to lose concentration: mess around and stuff.”

Noah also felt similarly, sharing in his questionnaire, "People didn't seem that interested halfway through, tried some options that hadn't worked, and so we got less focused." The group's cohesion diminished at this point in the activity.

After these resets and the disjointed conversations, Erin regained everyone's attention and led the group back to a failure scenario (Fig. 4.12). The group continued in the sequence, and some began to realize that failure was imminent. A reset was suggested. Alfie speaks up for the first time and says, "Wait, why? I don't think we need to reset again." The atmosphere surrounding the group at this point seemed more disjointed than before with more people talking at once.

The group had been working for fifteen minutes, and the researcher came back in from observing the experimental group. The loud, fractured conversations were ongoing at this point. Amelia spoke up loudly despite being constrained to silence and says, "Guys, can I make a suggestion? But this is not to do with how to do it." Perhaps those participants with previous experience were about to revolt against the researcher's silencing constraints. However, during the debrief, Amelia expressed frustration at the situation. She wrote, (Erin) was in the "… back... looking… and someone who was designated as our leader in the

middle. Everyone else had something to add, and people who weren't adding something were giggling in the back." She captured the chaos of the moments surrounding this stage of the activity well. She said it was "… really bothering me because you couldn't actually hear one person's voice."

Picking the narrative up at Amelia's commanding question, simultaneously, the researcher informed the group that the two silenced members with prior experience could now speak. Despite Amelia's commanding question, she conceded to Joseph. Joseph stepped up to speak following the researcher's interruption. Joseph received precedent because he had completed the activity more recently.

Interestingly, Joseph stepped in front of the group next to Megan and said, “So basically the number one rule is…” He hesitated and turned and asks the researcher, “Is this? This seems counter… Should I just tell them how to do it?”

The researcher responded by saying, “Do whatever you want.”

Erin chimed in: "If you can do it, tell us, yeah."

Joseph said, "Do you guys want to know how to do it, or do you want to work it out for yourselves?"

Henry clearly wanted to and said, “Yes!” while Alfie nodded emphatically.

Others seem more tepid in their response. Most people were smiling but giving no body language or verbal response to indicate that they wanted to receive the answer. Megan and Joseph both found this moment so interesting that they mentioned it during the debrief. Noah said, “I was a little bit upset” when not all the group wanted the answer. His way of expressing this in the group was a joke in response to Henry. Henry mitigatingly expressed that he did not want to take all the fun out of the activity. This was a shift from his initial approach. Noah jokingly responded with a viewpoint that receiving the answer would not take the fun out of the activity.

In her questionnaire responses, Erin recognized that "the group was divided in whether [Joseph] told us [the answer] or not." As a result of the mixed reaction, Erin asked Henry, "Do you want to work it out?"

Henry confirmed his adjusted response saying, "Not the whole thing, like the hints, give us a hint. Like what are we doing wrong?" Instead of answering the question, Joseph stood before the group taking Megan's place and spoke with command. He asked if everyone unanimously wanted the hints. As the researcher, I remember watching this moment and feeling as though perhaps Joseph had ruined the experiment because he introduced unanimity to the control group. I did not say anything because I did not want to influence the activity any further than this accidental intervention already had. It was also clear to me at this point that the group was divided anyway, and that the constraint of unanimity would not improve their division over receiving the solution. The response is so mixed when Joseph offered the solution that he eventually gave up and returns to his place at the far left of the line.

Following the activity, Erin reflected on this moment, sharing, "I learnt that some people would rather try and work out the solution themselves and fail more than they want someone to tell them the answer." Megan took back over and suggested carrying out sequences to their end before accepting a reset. Erin also made suggestions about how to proceed, but she received uncertain responses in return.

All of a sudden, Oliver discovers the answer. Oliver looks to Erin and says, "You do it [i.e., lead], and then just make sure no one ends up, like two people back to back on both sides." The key is that a participant does not step into an empty square facing the back of another participant with further participants ahead still facing them. In sharing the answer, Oliver also gave a vote of confidence by telling it to Erin. Interestingly, in the debrief Oliver said that the way the group left their chaotic state (mentioned earlier) happened "…once we started talking, communicating. Then it kind of got to the point where we worked it out."

Oliver's view did not align with how the solution arose in the activity. Perhaps Oliver was showing humility in this statement because he did not want to take credit. Another possibility is that Oliver did not realize that he discovered the solution. A third possibility: Oliver is referring to the point when the group applied the solution, rather than when he discovered it.

During the exchange between Oliver and Erin, Noah and Leo are laughing at the other end of the line. Erin picks up on this because she wrote, “I think some people in the group started to get bored of trying and failing, so they started to mess about.” She later shared how this affected her. She wrote that “people…messing about or having a laugh made me think about how I treat others when I have a goal in mind. I definitely thought a lot about patience.”

They are corrected by Megan, who said, "Guys, just listen to Erin; it's probably best." Jack expressed his agreement with this sentiment in the debrief when he said, “We were the most efficient when we had one person… calling the shots.” Oscar affirmed this in the debrief as well when he emphasized the importance of “One person who could see well.”

Amelia crystalized this moment with a debrief comment when she said, “[Erin] is the one who ended up leading the whole thing, but she was the one who is keeping quiet. I think we needed people to just keep quiet to listen to each other: not just to see the person making the most noise.”

Henry also shared about this moment, expressing the importance of a slight change to the group’s strategy. He described the change as "bringing… one voice in and someone [Erin] stepping out." He elaborated on this experience saying it allowed "…time to reflect on what's going on…" A chaotic environment allowed the realization of a course correction.

Jack shared, "We realized that many people attempting to call the shots wasn’t going to help us complete the task.” Jack shared in his questionnaire that this shift was impactful for him. He said “I realised my tendency towards wanting to have a voice in the group more than

contributing the best way I could: even if that meant being quiet [for] others who had a better perspective, (such as [Erin]), so that the task [could be] completed.” He continued later, "I learned that those who are often calm and collected and speak when necessary are those that lead well. I learned that those [who] are the loudest aren't necessarily the clear or better leaders." Many participants shared about this chaotic time.

The affirmation toward Erin's leadership from Oliver and Megan indicated a shift from Henry's leadership. Recall that early on in the activity, Henry was nominated to lead by Noah. Though Erin and Henry both affirmed this decision, there was little reaction from the rest of the group. Amelia seemed to have been impacted by this. In her questionnaire response, she said, "I am going to be less likely to let vocal people take over [in future groups]."

In questionnaire responses, Noah expressed the group’s “deciding on leadership was different.” Maybe he is expressing the difference between Henry and Erin, or perhaps he was reminded of the mixed response he received in light of Henry's installation as the leader.

Erin gave even more insight into the shifting leadership situation when she shares, “I think because we selected a ‘leader’ at the beginning of the task who turned out not to know how to complete it, people in the team didn’t know to interact with others who were opposing what the 'leader' said." Erin thought that others did not know whether to keep following the leader or try to encourage someone else to lead. Erin also shared a personal uncertainty: "I had an idea of how to complete the task whilst not being the 'leader.' My idea was different to his. I was unsure whether to speak over him or let him continue, knowing it wouldn't work." Erin illustrated the confusing tension that came from Henry's initial installation as the leader. The leadership began to shift from Henry to Erin, who offered consistent, focused direction from the back. She had an advantage of perspective too, standing slightly out of line to gain perspective. Though Henry and Erin both led the group to erroneous scenarios, for some

reason, the group identified Erin as a better choice. The transition impacted Erin. She wrote, "[The activity] made me think that some leaders won't necessarily be those that stand out straight away. I noticed when I stood back and watched as we did some trial and errors in the activity. This might be something that I would like to do in other groups as well, instead of stepping in straight away when I'm not completely sure on answers." Erin seemed moved to delay immediately stepping in as a leader in the future, suggesting this would permit time for observations prior to leading.

Amelia also made an interesting comment about this shift when she shares, "I think everyone was very comfortable with each other from the start. So, although the power shifted, people's interactions didn't become uncertain." It seemed clear that a great deal of uncertainty about how to proceed had come over the group, which included a shift in leadership. Despite the researcher observing uncertainty as demonstrated by confusing and fractured conversations, uncertainty was not everyone's experience. Nevertheless, there is sufficient evidence to illustrate an initial leader being selected and then a choice being made toward a different leader who showed herself more suited to manage the group.

Oscar also commented that “it took a while before we delegated on one person (who could see the pattern and situation from the side and rear) to direct movement. Had this decision been made sooner, it would have greatly expedited our process." For Oliver, this critical decision could have come sooner, suggesting that something caused a hold-up.

Despite distracted participants and a false start, the group began to see the correct sequence under Erin’s leadership. They made significantly more progress until it was Noah's turn. Noah then made the incorrect move and forced the group to a reset. Those close to Noah teased him for ruining the effort while Alfie clearly expressed a grimace of disappointment. Noah said, "Sorry about that guys" with a snicker to finish off the interaction. Later in the

debrief, Henry identified this specific reset and says, "We got back to the beginning, and actually that's the catalyst for actually getting us success at the end."

Noah's joking nature grew apparent throughout the activity. Interestingly in the debrief, he expressed that "a good, strong voice" was needed to lead a group. He also mentioned that a leader should have "good direction, [and be] sensible." He continued, "Logical leadership helps the group work well together." Noah's espoused philosophy of leadership showed some dissonance with the demonstrated behaviour in the activity. When asked to summarise the activity in one word, Noah chooses the word “Humour.” Noah reflected on his humour in his questionnaire when he shared, “I was having a bit of a laugh and realise that is not everyone’s cup of tea. And [realise] how that impacts other people and need to be more sensitive to that." Even a week later, Noah relayed that he was still "thinking how I need to remember how everyone is involved in a team and to be a little less selfish."

Erin seemed to have picked up on this dynamic because she wrote in her questionnaire, “My attitude towards a person in our team changed during the activity for the better, but it didn’t have an effect on how I viewed them outside the activity. It was because they were messing about in the beginning but soon settled and helped work out the activity.” Despite Noah’s silly attitude throughout the activity, Erin shared that her opinion of him was not negatively impacted and even improved because he settled to help work on the activity.

With another attempt the group gets even closer to completion Their efforts were thwarted as Erin gave an incorrect direction. The group reset as Megan exclaimed, "You've got 30 seconds! Last chance! Last Chance!" Jack says, "Go! Go! Go! Back! Back! Back!" Everyone hurries to get into position. The intensity of this moment built, and then everyone silently listened to Erin who step-by-step told everyone the correct sequence, and one could hear various members of the group affirming and checking Erin's calls to themselves.

Harry illustrated this moment when he shared in the debrief, “when the pressure [was] there to get it done when we had thirty seconds left, people then got focused.” Finally, the group achieved the solution and gave themselves a big round of applause. They raised their hands, and someone shouted, "Yeah!" in triumph.

On a final note, Jack and Erin both mentioned the importance of different peoples' strengths. Jack said the activity "… taught me a lot about being aware of and seeing the importance of different peoples' perspectives and gifting. It stirred me to want to be more encouraging of people to step in and use their gifts whist recognizing they are indispensable for getting the group task done." Was this comment related to Erin's slow, observant rise to leadership? Answering a later question on the questionnaire, Jack added, "I want to be more aware of people around me, to see their giftings and ways that they can serve that are essential for us as a group."

Perhaps Jack was referring to Erin, but Erin shared a comment of her own. She wrote, the activity "… made me think more about how to recognize, utilize, and encourage others in their giftings within the group." Either way, Erin and Jack both felt the importance of recognizing people's individual strengths as a result of this activity.

UNITED KINGDOM EXPERIMENTAL GROUP CASE-HALF OBSERVATION NARRATIVE

Ethan, the experimental group's facilitator, started the activity differently. The group was also a little different in that the genders were more evenly mixed. Additionally, one of the church's organizational leaders was in Ethan's group. Ethan explained the entire activity to his group while they sat and listened to the explanation. This explanation took about two minutes, and participants followed with a few clarifying questions. Next, Ethan invited participants to take their places on the squares, and participants immediately knew to divide themselves and face each other based on Ethan's guidance. Similar to the other group, the participants divided themselves up with five people on the left of the empty space and six on the right (Fig. 4.17).

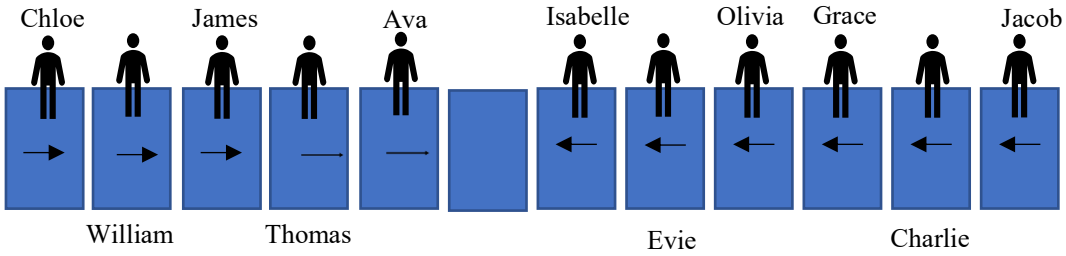


Figure 4.17 - U.K. Experimental Case-Half Starting Positions

Immediately, the same scenario that happened to the control group happens here (Fig. 11 and Fig. 12). Isabelle was standing next to the empty space. She made the first move into the empty space ahead of her. Ava, facing opposite, jumped around her. Isabelle then moved forward again into the newly vacated square. The empty space was in the middle of the group and was behind both Ava and Isabelle. Again, this scenario meant failure, and a reset would eventually come. Ethan was reading the group's realization that a reset was pending when he asked, "So do we think it's not going to work, yeah? So, reset it. Back to the start again." This attempt was quiet, involving little interaction between participants.

Later, Ava reflected on this moment and said, “I saw the completion of the task as priority rather than how we’d complete it. I think we should have maybe strategized first rather than diving straight in.”

Upon this second attempt, participant interactions significantly increased. Many ideas were shared before anyone made a move. The first two moves went precisely the same way as the previous attempt; therefore, the group made the same mistake. After a few further legal moves, they again realized a traffic jam had occurred, and a reset would be required.

Following the second attempt, Ethan identified a suggestion Evie made just prior. Ethan asks Evie to repeat the suggestion to the group. Evie said, “Each person should take a turn from each side.” This suggestion led to significant progress and then the same failure as the control group’s second attempt (Fig. 4.14, 4.15, and 4.16).

On this reset, James and William discovered the answer. James spoke up and identified that one cannot have two people in a row facing the same direction. Interestingly, James was confirming this with Jacob. James was looking directly at Jacob, who was on the opposite end of the line when he said, "You can't have two people [gestures to himself and William who is facing his back] can you? As soon as you've got two people, you're gone, aren’t you?” He apparently received confirmation from Jacob, and everyone in the group nodded in agreement over this revelation.

Jacob commented on this interaction in his questionnaire. He said that as a result of the activity he felt his "relationship maybe a little closer with James, whom I could explain how the system of the game works." He continued, "[James] got it nearly, but not fully." This moment was significant because Jacob tried to pass his understanding along to James, but it does not lead to success.

James commented on the interaction he had with Jacob in the debrief. He said, “I ended up leading [the activity] and actually believe I was the wrong man to lead it because I

didn't quite understand it. So, what happened… Jacob set something in motion that I then understood… Then I just communicated with people to do it. But then people thought that I knew what I was doing, [but] effectively, I was just communicating what Jacob had started off." James was crediting Jacob with discovering the solution but was suggesting that he himself only understood a portion of the solution. He also shared that when he communicated this partial solution to the group, they responded to him by thinking he knew how to solve the activity. He elaborated by saying, "When it came down to me, I'm like oh crap I didn't really fully understand this."

Jacob later shared in the questionnaire, "James, who is a good leader…saw that I had the knowledge how to solve it, but he got chosen to be the speaker." Jacob later adds, "[It's] not always… in my life that others listen to me. Sometimes yes, sometimes not." Jacob later shares in the questionnaire, "James, who is a good leader…saw that I had the knowledge how to solve it, but he got chosen to be the speaker." Jacob later adds, "[It's] not always… in my life that others listen to me. Sometimes yes, sometimes not."

At the beginning of the third attempt, Ava asked Ethan, "Do you know the answer to this?" Ethan told Ava that he did not have a clue, and the group started their next attempt without much thought to the question or the answer. They repeated the same starting mistake despite their feelings of progress from the last attempt. They seemed to realize a reset was required in fewer moves this attempt. This attempt began differently. Isabelle began as usual, moving into the empty space ahead of her. Ava also responded as usual by jumping around Isabelle. Then Isabelle realized she should not go because this would make the same mistake as before (Fig. 4.12). Instead, Isabelle invited Thomas to take the empty space in front of her. After two more moves by Evie and Ava, the group initiated the failure scenario again. Much discussion arose about why this failure occurred. The reset occurred, and the group came again to the same place where they had to reset on the previous attempt. Even more

discussion ensued about what to do next, then they made the same mistake they did on the previous attempt. Ava expressed her sentiment about these failures in the debrief when she said, "It was very frustrating because we kept getting stuck at the same point each time." Grace noted this trend in her questionnaire: "I think we kept getting stuck at the same bit, but as I kept my place in the queue, I couldn't really see what was happening so wasn't too sure why."

Olivia confirmed this lack of understanding in her questionnaire response when she said, "We kept making the same mistake without understanding why."

William said, "We ended up in the same physical situation several times."

James also felt this sentiment. In the questionnaire responses, he said, "[We] kept getting stuck in the same point." James suggests a "change of leadership" was needed to address the problem.

This frustration did not hinder Ava; instead, it motivated her. She continued, "… [it] kind of gives you a sort of momentum that you wanna work out how to do it."

Olivia likewise felt inspired as a result of resetting. She wrote about "The importance of reset. That failure is a part of learning."

Jacob saw things differently in his questionnaire. He noted the repeated mistakes by saying, "We repeated the same mistake again and again." But he attributed it to a different cause. He said, "More so it was James, the only speaker, who was stuck and could not figure out how we did it the first time." He conceded that this was his point of view, but it is interesting to have someone identify the cause of the issue as resting on a single, leading individual.

During this reset, the researcher reminded Ethan to offer the hints unanimously. Ethan offered the hints to the group, and Ava's body language immediately communicated that she did not want a hint. Chloe, on the far-left end of the activity, said, "Wait a minute! Wait,

don't." and waved Ethan off. The entire group received this with laughter, dismissed the hints, and continued discussing the activity.

William asked Ethan for clarification about who received the hint by asking, “Each team?” Showing that he thinks the activity may not be cooperative.

Chloe asked Ethan, "Can we all move at once, at all?" Upon Ethan's disconfirmation, Chloe says, "All right, yeah, give us the [hints]."

During this discussion, Ava changed the subject and asked a direct question to Jacob that everyone could hear. Ava was standing in the middle, and Jacob was at the far, right end. Ava asked, "Jacob, do you know what the solution is?" Ava shared in her questionnaire that "[She] began to see that Jacob was logical, but he wasn't quick in communicating the logic with the group." Perhaps she wanted to offer him the chance.

Jacob responded with a well-received joke before explaining the solution in crystal-clear detail. Jacob said, "If one person moves forward [the activity] is not possible if another person moves behind them facing the same direction." This comment marks the second time the solution to the sequence was shared; however, this time, it was more explicit.

Later in her questionnaire, Ava wrote, "We were uncertain who to choose as the one who could speak. We chose James, I chose him because he communicated the logic. We realized it was Jacob's logic! It was clear that Jacob could help, so [James] and Jacob switched roles quickly." This was most likely the moment that everyone saw Jacob's as the one who was most attuned with the solution to Traffic Jam.

Following Jacob’s advice, the group started again. There was a tentative start with Jacob’s quiet direction. Thomas, Olivia, Ava, and William were vocal during the tentative start. Interestingly, Jacob attempted to offer direction when the group hits a moment of hesitation. At this point, James took over, offering the same statement of direction. James' direction giving slowly built from this point while Jacob's diminished. James comments on

this in his questionnaire by saying, "I jumped in when I needed to be quiet when Jacob was leading: stopped his flow."

During this final attempt, Ava and Oliva made absolutely sure they made the correct moves when it came to their turn. Ava observed that "Olivia is confident to speak out." Perhaps this collaboration was part of the reason she said that. The group's momentum continued to build, but each time the direction of movement changed in the activity, the participants double-checked with each other to make sure they made the right move. More and more momentum built; concurrently, James grew in confidence in giving directions. Finally, the group achieved the solution. They gave themselves a round of applause and raised their hands in the air. Ethan cried, "Yes!

Interestingly, James commented on this in the debrief. He communicated that once "Jacob took over. [The group was] straight away to it." This conclusion seemed to contradict the events in the recording. While Jacob was instrumental in ultimately figuring out the solution, he only briefly seemed to have charge over the group. Jacob made a clear suggestion as to how to solve the problem, the group then played out his suggestion, but James took over in giving communicative direction to achieve the solution. But everyone seemed to accept a different reality: that leadership was transferred to Jacob. It is possible that the researcher missed a detail that would have suggested this conclusion while reviewing the video. Another possible explanation for this discrepancy is that Jacob's two directions were enough to establish him as the leader in the eyes of the group.

Chloe, positioned at the far left of the line, was less involved in the discussion about leadership. She said, "It was like most of us were quiet and were just like, tell us what to do." She said she "didn't feel confident about [her] ideas" in the questionnaire.

Ava picked up on Chloe's quietness. She said, "William and Chloe [were] quiet when they didn't know what to do."

Grace was quiet for a different reason. She felt that "this was a more abstract task, and people didn't really have a defined role." She said, "I was happy to just follow along with everyone else" and also felt hindered because of her place in the queue.

Chloe, though quiet, did hold an opinion about who the leaders were: "I think in our group we had clear leaders. It was up to Ava, James, and Jacob." Chloe also shared that "James seemed to understand more than he did." She reflected upon how she treated others as a result of "not voting for Jacob because of a wrong judgment of his ability." These reflections seemed to move her not to "look to the usual leaders all the time."

Ava disagreed with Chloe about being a leader herself saying, "Not me, I'm not a leader I didn't have a clue." despite her instrumental checking of steps with Olivia during the final attempt. Ava said, "I didn't feel that I was contributing to the group's success because I didn't know how to work it out. I was relying on others to work it out." Ava and Olivia played crucial roles as they were critical moving pieces at a decisive transition in the Traffic Jam activity. Without them, the group may have been unsuccessful, but this was lost on Ava. Helpfully, Ava clarifies the dynamics of leadership that took place surrounding Jacob. She said, "We recognized that Jacob knew how to do it. So, as a group, when he spoke, we realized that he got it, and he got us moving." That reflected more accurately the unfolding of events that took place in the activity. Jacob offered a helpful suggested that gave the group momentum, and James was the person who seemed to help the momentum build by communicating the solution well.

Observationally, it appeared that James was an accepted natural leader over the group. This could be because of his communication ability and his organizational leadership role. About this, William said, "We all know James is [an organizational leader] here. So perhaps subconsciously we went, 'We already have a level of trust him.'" William also

communicated this in his questionnaire when he wrote, "I assumed James would be the best 'leader' as he is our [organizational leader] and a leader in other areas."

Following this comment, James immediately exclaimed, “Misguided!” with a palatable tone of humour. James shared more on this in his questionnaire: “A lot of people trusted me to take leadership even when I indicated it would have been better for another person to lead.”

However, it seems misdirected that the group wished Jacob was the outright leader because Jacob was very soft-spoken throughout the entire activity. Jacob said in the debrief, "I kind of figured it out, I think: the logic. But I wasn't too sure, and I didn't want to lead." Jacob wasn’t the only person to feel this way. Olivia shared that she was unsure how others would respond to her because “I wasn’t 100% sure my ideas were right.”

Grace, who was standing just in front of Jacob toward the far-right side of the activity, said, "After James had done a couple of tries, then Jacob said, 'Oh yeah, I should have led.;" So, it was not Jacob’s soft-spoken demeanour that kept him from leading, but instead his uncertainty about his solution.

In the questionnaire responses, James also identified this issue. He shared that he “saw another leader able to lead, but not having confidence in himself to do so.”
Chloe supported Jacob as the leader in her questionnaire by saying, “I felt more confidence in Jacob’s ability at the end.”

Ava also expressed that she was moved to "listen to those who are quiet or who perhaps aren't able to articulate themselves well" in the future. She exclaimed, "Don't just listen to the loudest person." There seemed to be a shared sentiment amidst the group that someone quieter had a lot to offer, and those with more commanding voices may have confused that process.

United Kingdom Case Coding and Thematic Analysis Report

United Kingdom Case Theme: Leadership Expectations

The most widely referenced theme resulting from this thematic analysis circled around the topic of leadership expectations. Participants had many thoughts to share concerning what the ideal leader would be like, both abstractly and practically in the activity. Some felt that they should not be the leader. Others shared how having an organizational leadership role influenced the Traffic Jam activity. Finally, many participants expressed how a leader should and should not behave.

Leadership Expectations Sub-Theme: Who Should Lead? Not Me.

A significant sub-theme that arose as participants expressed who they thought should lead was that the leader should not be themselves. There were different motivations behind this attitude. Noah chose not to lead partly due to indifference and partly because he was usually a leader. He wrote, "[I] Felt quite indifferent to the task. Usually, I lead, but I had made a decision to sit back and be told what to do. So [I] was happy to be a bit daft and listen for instruction."

Others were leaders in other areas and decided to hold back in this activity for different reasons. Grace said, "I think, as I do a lot of team leadership as part of my job, I was very conscious not to put myself forward as I probably work quite hard not to let people in my personal life know that – I'm not really sure why! I was happy to just follow along with everyone else." Grace seemed to be a leader in her profession and prefers her leadership skills to remain more private in her personal life.

Another example was Thomas, who sheds his leadership with this group due to others who were more experienced. Thomas wrote, "In a university setting, I'm generally the one who leads, but in a church setting where there are many older and wiser people, there, I'm not so much of a leader."

Besides stepping back from leadership for expertise, others felt as if they were not a leader due to lack of perceived ability in the activity. Ava shared in the debrief, “Not me, I’m not a leader. I didn’t have a clue.”

There was an interesting deflection of leadership from the organizational leader. James shared, "A lot trusted me to take leadership even when I indicated it would have been better for another person to lead." He expressed that he wanted someone else to lead because someone else may have been better suited.

There were several reasons for deflecting leadership demonstrated in this activity. Sometimes the reason for averting becoming the leader was perceived to be a lack of one's own ability in Traffic Jam. The majority of leadership deflection happened because participants had leadership expertise outside of the Traffic Jam activity, including leadership roles within the organization.

Leadership Expectations Sub-Theme: Organizational Leader Influence

Another major sub-theme in this category included thoughts about how an organizational leadership role influenced the activity. An important note is that these themes stemmed from both activity sets. Oscar from the control activity shared, "I learned that some members who are leaders in a church context (including myself) aren't necessarily the natural leaders in a social group context. Leadership in one or two areas does not correlate to leadership in all areas." Oscar was a church leader.

In the experimental activity, Evie shared, "James, even being the pastor, was not able to lead with the same ability that Jacob was." This comment referred to the situation where James was a communicator, but Jacob was the one who solved the problem.
William also added to this theme when he said, “We all know James is a pastor here, so perhaps subconsciously we went, as we were talking we said, ‘yeah we already have a level of trust in him.’”

Many participants in the group commented on how an organizational leadership role influenced their thoughts about who should or should not lead the Traffic Jam activity. The general sense expressed was that the organizational leaders may not have been the best suited to lead the activity and may have even slowed the process of identifying the appropriate leader for the activity.

Leadership Expectations Sub-Theme: Character Descriptors

The final sub-theme of leadership expectations related to all the descriptors participants shared about a leader. Noah wanted a leader who provided "clear direction, sensible, logical leadership" and who "helps the group work well together."

William expressed the importance of leaders who were “prepared to look to other quarters for help.”

Jack even shared, “I want to be a leader who truly knows what it is to serve his people, not dominate over them.” Here he connects the ideal leader with service and not dominion. There were several who expressed these ideal leadership traits.

Others had opinions about what a leader should not do. Amelia shares the importance of “not just seeing the person making the most noise as the person who knew what was going on.”

Jack felt similarly about loud leadership. He reflected, “I learned that those that are the loudest aren’t necessarily the clear or better leaders.”

United Kingdom Case Theme: Communication

The second major theme discovered in this thematic analysis centred around communication. There were four main sub-themes to this category: quietness, listening, the opinions of others, and too much talking.

Communication Sub-Theme: Quietness

Some simply made observations that quietness was happening like Chloe, who said, "It was like most of us were quiet."

Others added a nuance that observation was paired with quietness. Amelia said, “The people who are keeping quiet are often the people who are looking.” She cites Erin to support this conclusion. Amelia asked Erin “Do you know what’s going on? Could you just do [the activity]?” Amelia quoted Erin’s response saying, “’No, no, no, let me just watch.’”

Thomas wrote about Jacob's quietness. He shared, "I admired how Jacob quietly but confidently understood what was going on. It shows we should listen to everyone, not just the loudest person."

Jacob reflected that next time he would like to "ask listeners in the group, how they see things," apparently connecting observation and listening. He also connected quietness with shyness when he said he would like to "ask rather shy people" what they think in the future.

Quietness was also attributed to other items, such uncertainty about what to do. Ava identified "William and Chloe [were] quiet when they didn't know what to do." Ava also attributed quietness to an inability to articulate oneself; saying, in the future, she would like to listen to those "who perhaps aren't able to articulate themselves." Quietness appeared to be a mixed bag as a sub-theme. Some simply observed quietness while others took an interpretive approach. Those who interpreted were mixed in their conclusions. Some found quietness to be a tool for observation, while others saw it as an indicator of uncertainty.

Communication Sub-Theme: Listening

The next sub-theme of communication that was listening. Oliver shared that “some members would listen and some would not." There were varying levels of listening taking place during Traffic Jam, and Oliver was able to capture that mixture with this statement.

Jacob added detail to this sub-theme when he expressed the personal impacts of listening. He wrote, “Not always happens in my life that others listen to me. Sometimes yes, sometimes not.” Jacob, being a quieter person, felt the effects of those who were unwilling to listen.

Amelia shared a great deal about listening in the debrief and in questionnaires. She made a point to emphasize the importance of listening when she shared, “We need to actually be listening to each person in the group.” Listening was critical to Amelia.

Amelia was not the only one who felt the importance of listening. Oliver also expressed, "It's best to listen to others to the benefit of yourself and what you're doing."

Communication Sub-Theme: Too Much Talking

This sub-theme was squarely represented by the control activity. The topic of chaos came up in the debrief. When asked what was causing all of the chaos, Oliver replied, “People just, everyone trying to contribute.”

Amelia described a frustrating scenario. She identified two leaders in her group and says, “any time either of them said anything, everyone else had something to add.”

Jack wrote, “We realized that many people attempting to call the shots wasn’t going to help us complete the task.”

Oscar also observed, “There were so many viewpoints being expressed at the same time.”

Clearly, the control half of the case experienced negative communication aspects. When too many people were talking at once, it produced chaos, and participants cited it as an inhibitor to success.

United Kingdom Case Theme: Repetitive Failure

Repeated failure was a part of both groups, and many participants commented about this major theme as well; however, the opinions about, and outcomes of this repetitive failure

were varied. Ava expressed a dual experience resulting from repeated failure. She shared, "I was very frustrated because we kept getting stuck at the same point each time, but then that kind of gives you a sort of momentum that you wanna work out how to do it." She was both frustrated and motivated by failed attempts.

Noah simply connected repetitive failure to loss of interest. He shared, "People didn't seem that interested halfway through [the activity. We] tried some options they hadn't worked and so we got less focused."

Henry wrote that, "for the first few minutes we kept making the same mistakes over and over again so that we didn't really learn from what we were doing." But in that failure, Henry also described "[having] time to reflect on what we're doing wrong." He makes this point twice in the debrief. So, for Henry, repetitive failure initially resulted in no learning, but then a moment of reflection occurred during the failure.

Olivia reiterated that. "We kept making the same mistake without understanding why." She observed that failure was occurring, but also observed the group could not determine the reason for the failure. Later she added that "Failure is a part of learning," which echoed Henry's sentiments.

Evie also connected repetitive failure to a reflective conclusion. She wrote, "We kept getting stuck at the same section and we realized we had to make a change." For her, there was failure followed by realization. Many participants observed this theme of repetitive failure. Some went further and connected the failures to a lack of focus, while others saw it as a moment of reflection: a learning opportunity.

United Kingdom Case Theme: Transference Output

A fourth major theme discovered in this case centred on reflective thought processes. Participants had introspective thoughts, learning experiences, and transference reflections as a result of Traffic Jam and its debrief elements. One example comes from Jack. Jack wrote in

his questionnaire, "I learned that those who are often calm and collected and speak when necessary are those that lead well. I learned that those that are the loudest aren't necessarily the clear or better leaders." Of course, this quote ties into other themes, but Jack was willing to say that he learned that principle from this activity. This statement appeared as a deep reflection about the activity that Jack connects with subsequent, hypothetical interactions that he had.

Jack's reflection did not mean that the activity deeply impacted everyone. While Amelia had much insight to share during the debrief, she shared in her follow-up email that she had a conversation about the activity about a week after it was over. About that conversation, she wrote, “I don’t remember what was said in those discussions." She thought about the activity, but those reflections did not stay.

Nevertheless, Jacob shared both in his questionnaire and in the three-week follow-up email that he wanted to be more reflective. In his email response, he said. "I was just thinking the days after the activity, … to reflect more often, ask rather shy people, speak with people…"

Olivia's response was a simple expression that "I enjoyed interacting with church people in a different way than normal." Olivia shared the enjoyment of a novel experience with people from her organization. That was a positive reflection, albeit not as deep as Jacob or Jack's. These are only a few examples of all the transference reflection that took place following the Traffic Jam activity for this case. Reflections began in the debrief and sometimes continued in the weeks following. For some, this reflection did not impact them. For others, the impact of reflection was simple. For others, there were deeply meaningful things to transfer from the experience to their daily lives.

United Kingdom Case Theme: Teammate Descriptions

Another major theme that emerged in this group was based on codes associated with teammate observations. Many participants reported their own opinions or observations about their teammates. For example, Jacob shared that James "has the ability to see potentials in people."

Ava wrote, “I began to see that Jacob was logical.” She also wrote, “Olivia was confident to speak out.”

Evie also wrote, “Jacob is a logical thinker that needs to trust his instincts and put it into practice.”

Oscar wrote that he “Grew in affection for members of our team and recognized various attributes of individuals that could be beneficial to [the church] and neighbourhood.”

While many observations were positive, some were less so. Oliver shared, “I was surprised that some people were less focused on the task than everyone else was.”

Amelia observed, “One individual is very loud and busy despite having no ability.” The participants in this group had many opinions about each other. Some opinions were good, and others were less positive. It was clear from the thematic analysis that they were well aware of each other's traits during the activity.

United Kingdom Case Summary: Vignettes and Themes Comparison

United Kingdom Case Vignettes

United Kingdom Control Group Case Half Vignette

The facilitator's explanation of Traffic Jam asked the group to demonstrate the rules. This group included considerable joking around from one particular group member. This group consisted of two women and eight men: one of the women became the leader. Some members of the group selected an initial leader, and a slow process was required to shift the leadership to the person who led the group to success. This group started with much

conversation until they talked so much that people could not hear each other. Next, the group fractured as some lost interest due to repeated mistakes. This group entered the failure scenario and continued past it without realizing they had made mistakes. Failure summarised in Figure 4.12 failure was eventually followed by the failure shown in Figure 4.16 before the group found the solution. When resetting, the group felt they repeated mistakes without learning, but then experienced reflection in their resets. The group had the opportunity to receive help from two experienced participants, but not everyone wanted their help. The facilitator freely offered at least one hint. Finally, the group came back together once a quieter team member discovered the answer. The person who discovered the answer was not the leader; instead, he shared the answer with the female leader to give her a vote of confidence. This group appeared to want one person to call the directions for the group. The person they eventually identified as best suited to lead stood at the very end of the line and off to the side to gain perspective. On the successful attempt, the leading group member directed movements while almost all group members checked her decisions.

United Kingdom Experimental Group Case Half Vignette

The facilitator of this group gave all the instructions without any physical demonstrations. The group's first attempt resulted in failure (Fig. 4.12). They did not play out the failure until they ran out of legal moves but instead realized that there was a problem and reset. There was a definite increase in the group's conversational interaction after the first attempt: this included many clarifying questions of the facilitator. They repeated failure scenarios multiple times (Fig. 4.12 and 4.16), but these failures seemed to develop momentum, motivation, and learning in some members of the group. Everyone generally remained focused on the task at hand. This group identified a leader early on due to his strong communication skills, paired with his leadership status within the organization. However, the person with the solution was a soft-spoken man. Many in the group expressed that they

misplaced their confidence in the strong communicating leadership of the organizational leader rather than the soft-spoken man with the solution following the activity. This group would not unanimously receive the hints. Some expressed they had no good ideas about how to solve the problem. Some of those who felt they had no good solution ideas remained quiet while others without solution ideas engaged. As this group completed their successful attempt, the quiet man began leading, but the organizational leader took over with his strong communication skills. Others in the group played a critical role in checking his directions for accuracy to make sure the group achieved a successful outcome.

SUMMARY OF UNITED KINGDOM CASE THEMES

Based on the themes developed in this study, the group seemed most focused on expressing their ideal of leadership. This theme included codes about participants not wanting to lead the group. There was an added nuance of how organizational leaders influence an activity like Traffic Jam. While making suggestions about good leadership, participants also had a great deal to say about their teammates. They made positive and negative observations about their fellow teammates. Many participants also shared about the communication process. They focused on listening and quietness most of all: too much talking was cited as a communication hindrance. Finally, many participants reflected upon repetitive failure. Some simply observed it, others felt it a cause for distraction, still others took it as a learning opportunity.

4.3.2.2 UNITED STATES CASE FINDINGS

UNITED STATES CASE DEMOGRAPHICS

The case from the United States was sampled from an information technologies team at a university in the South-eastern United States. The ages of the participants in this case ranged from 23 to 26. The case consisted of 14 people. Two volunteered to be facilitators: Elijah and Emma. Both facilitators self-reported less than two years of leadership experience.

Each facilitator was in charge of a group of six participants, and each group consisted of four men and two women. The activity took place in rooms located adjacent to the information technologies offices at the university. Madison was a little different from the rest of the group because she was both an international student as well as a student worker. All the other members were staff members and not international. Mia shared that she had worked for the company for one week.

Researcher Journal on United States Case

Following this activity, I journaled about this group. My first remarks were about their age. This group was older and more professional than in my first two cases. The first two cases I studied were student groups, so it was exciting for me to see professionals participate in the activity who had a broader range of ages and experiences. I was specifically moved by the tone and the atmosphere of this group. I wrote, “This group was lively and fun: they felt very connected to one another. I really enjoyed working with them.” I left our debrief feeling happy and having genuinely enjoyed this team. They seemed like a healthy team. I also had some specific thoughts about the two halves of the case. For the experimental half, I noted that they completed the activity first. However, for the control group, I wrote: "It seemed as though the explanation given by the control group's facilitator was very unwieldy for the group." I remember making an effort to stay out of the interactions Elijah was having with his group. I wanted to respect the research process I designed and allow a facilitator's fingerprints to incorporate into every activity, for better or for worse. I made this decision because I wanted the activity to mimic a real-world scenario. Sometimes we participate in activities that could have been facilitated in a better way. I remember feeling like I would have more thoughts later when I observed the footage of the activity. I wrote, “Further review of the video evidence may offer more helpful reflection, but that’s a first brush impression.”

Observation Narratives of Video Recorded Activities for United States Case

United States Control Group Case-Half Observation Narrative

Before this activity began, Logan expressed something that the set the scene for the activity. He said, "We had a pretty good understanding of who is capable of what going in." This statement can probably be attributed to the fact that this team had worked together for several years.

The facilitator, Elijah, immediately instructed the group to stand on the blue squares laid out before them (Fig.4.18). For some reason, Elijah began with an impression of a primary school teacher. He began explaining by saying, "Boys and girls, I'm so happy that

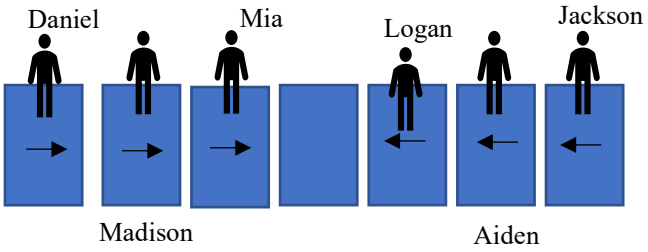


Figure 4.18 - U.S. Control Group Case-Half Starting Positions

you could be here this morning, this is the three-year-old class! Do you know what a straight line is?" The group gives some laughter to this, but Elijah does not break this joke until he has trouble remembering Aiden's name when giving Aiden instruction. It is hard to tell why Elijah did this, but later in his explanation, he says, "I might use this [activity] in my three-year-old Sunday school class." Perhaps he thought the activity was simple? During the instruction, the researcher stepped in to clarify that the group needed to be divided in half with the empty space in the middle. Elijah set this group of six up with four people on the left and two on the right of the empty space. After this correction, Elijah explained the rules of the activity by having participants act the rules out.

Towards the end of the instruction, Mia said, "Oh, so it's like in chess." Earlier, Elijah related the activity to checkers. After this, Elijah let the group begin. Logan was to the right

of the central, empty space. Mia was left of it. Logan moves forward into the empty space, and Mia jumps around him in the same manner as is depicted in Figure 14. From this, a lengthy discussion ensued. At the beginning of this discussion, Mia could not remember Aiden's name either and refers to him as "Doofus."

Aiden responded by saying, "Nope, try again!"

While no more was said about that exchange during the activity, Mia brings this back up in the debrief. She said, "I hurt Aiden's feelings" in a joking tone. During the debrief, Emma told Mia that Aiden would get over it.

Aiden did not like this at all. In his questionnaire, he wrote, "One team member tried to manhandle and use slightly demeaning terms for me." Answering a different question, he said, "One person tried to be vocally and physically in control. She felt too comfortable with manhandling other people." Later, Aiden would reflect whether he himself would commit this type of behaviour. In the debrief, Aiden tried to express his displeasure.

Elijah made a comment in the debrief, likening Traffic Jam to moving chess pieces. Mia says, "That's true, but you can't move a human like that."

To that Aiden interjected, "But you tried."

Going back and reviewing the video, it appeared that Mia used physical touch more liberally than others in her group. It was difficult to decide which moment made Aiden so uncomfortable. There is a moment where Mia grabbed Aiden's jacket. This action looked like the most direct form of contact Mia made towards Aiden during the activity. Despite this interaction, Mia repeatedly affirmed the closeness of the group during the debrief. In her questionnaire, she wrote, "I think that we did a great job relating to each other, and everyone was nice the entire time." She added in her questionnaire, "I felt very safe explaining how I felt, and I never felt uncertain at all." During the debrief, she mentioned the issue to Aiden. Aiden insinuated his discomfort to her, but Mia ultimately feels positive about the group.

Mia's expression showed awareness that she hurt Aiden's feelings, but perhaps she did not realize the degree to which it bothered him. The bottom line was that Aiden did not like how Mia treated him during the activity.

Logan moved the conversation beyond Aiden's irritation with Mia by saying, "This is a pivotal moment, I think… After we get to this point, our biggest thing is we can't go backwards. So, we have to do this step right." In the debrief, it appeared as though Logan initially assumed no resets were possible. He said, "So nobody told us we could try more than once. And that was one of the reasons we never went for it." He was afraid that if they ran out of legal moves, they failed utterly with no chance to try again.

Mia felt the same way because she expressed this in the debrief: "Right, we just stood there because we were like, we have one time."

Elijah confirmed that he indeed forgot to share a rule. In the debrief, he said, "Yeah, I forgot to mention you could reset."

During this moment, Mia turns to the researcher and asked, "Are we timed on this?"

Elijah said, "We are racing Emma's team!" Apparently, this group felt competitively against its counterpart activity.

Following these comments about competition, Logan stepped forward after Jackson on the far right said, "You've got to go forward.

Logan agreed and said, "I *have* to go forward." This decision puts the group into a failure outcome scenario (Figure 4.12).

After Logan's move forward, the facilitator, Elijah, gave two suggestions that confuse the group. First, he said, "Do you find that your limited viewpoint makes it difficult to mentally problem solve this." Nobody responded to this, but the group listened closely for helpful information. In the video recording, it appeared that Elijah was offering the group the first hint in a cryptic way. Immediately following his first comment, Elijah shifted from the

possible suggestion of the first hint to another enigmatic hint when he said, “I Just noticed there’s a dry erase marker.”

The group attempted to interpret Elijah's statement about the marker. Logan says, “Can we draw on our [square]?

Aiden says, "Can we drawn on you, Elijah?" Making a joke but communicating his uncertainty about what this supposed clue means.

Mia said, "Oh, we're drawing out the plan to see which one is going to work."

While Mia has squarely discovered hint number two, Elijah continues with a mysterious response instead of giving confirmation. He said, "Well, I'm just saying, you know there are no arrows on the squares."

Mia responded to Elijah by saying, “I don’t know what you’re going to do with that.” Her expression summarized the confusion felt by the group.

This confusing interchange continued a bit further. The most explicit expression of hint two that Elijah gave happened when he said, "It's just pieces of paper, like a dry run. Not people."

An unambiguous expression of confusion crossed Logan's face, who is desperately trying to understand what Elijah was suggesting. The group eventually gave up and went back to working on Traffic Jam after Elijah reminded the group of the three illegal moves. At that point, the group began to realize they had met the failure scenario. They saw that they would run out of legal moves before solving the problem. Jackson vocalizes a few of hypothetical movement sequences that would all result in failure. Logan concurs with Jackson by finishing his train of thought, saying, "Everybody else is stuck and there's just one blank spot, yep."

Mia affirmed this sentiment as well. She commented on this moment in the debrief when she said, "We didn't even try to go through the whole thing. We did the first two steps,

and we're like, no. We knew this was not going to work." In her questionnaire, she added, "We got stuck trying to figure it out."

In the video recording, Mia was involved in the group problem-solving discussion in a way that seemed similar to Aiden or Logan. However, some group members shared opinions about her interaction in their questionnaires. First, Aiden said she attempted "constant take over of authority from other team members. She also complained about how we were failing." He later added, "[She had] no good idea of how to achieve the end goal."

Logan saw the situation differently. He said, "A new team member I don't know much about stepped up to help solve." Logan seems to see Mia's input as positive or at least neutral. The discomfort that Aiden felt earlier may have affected his interpretation of the situation. Elsewhere Logan wrote, "Mia steps up to take leadership and control of how to move forward." Mia took an active role in the steering of the group, but this action was received differently by at least two group members.

Despite differing interpretations of Mia's behaviour, the group decided for themselves to return to their starting positions: a reset. While Elijah never shared with the group that an option for a reset was available, they decided to reset on their own, not knowing resets were permitted. This confusion was not the only difficulty participants had with the explanation of the activity. Logan expressed in the questionnaire, "We weren't sure what we were allowed to do in order to solve – didn't know we could step off [the squares]." Unfortunately, even with the researcher being present, some of the rules were not clear to the group. Adding to Logan's confusion about the rules, he also expressed that "I wasn't certain if my conclusion was correct." There were layers to the confusion and uncertainty in this group.

Nevertheless, they continued trying to solve the problem. Upon the reset, another name confusion takes place. Daniel accidentally called Madison, Allison. Mia was quick to correct Daniel and said, "*MAD-i-son!"* to correct him.

“Sorry,” Daniel replied. Madison laughs at the exchange.

The group moved into their reset positions at this point. Participants felt difficulty because of the resets. Aiden expressed feelings of challenge in the debrief, referring to a time when "We messed it up and had to go back to the beginning." In the debrief, participants from the other activity expressed confidence found in resetting, but Aiden expressed, "Yeah, I don't think we felt as confident.”

The group carried on discussing possible plans of action while standing in the starting positions. Elijah clarified the setup rules with the researcher while Jackson said, "If we recognize it's impossible and we quit, does that count?"

Mia exclaimed, “It’s not impossible!”

In the questionnaires, Aiden shared, “We just reached a point where we all thought that we had thought of every solution and thought it was impossible.” Aiden identifies this as a moment of stall.

Logan said, “It’s a Traffic Jam. We abandon our cars and we just…” The rest of his joke cannot be heard because the group is already laughing loudly. A long pause followed, then Mia moves forward into the empty space. This finally broke the long period where the group was standing on the starting positions. Another lengthy discussion followed where the group discussed possible courses of action. Mia, Logan, Aiden, and Jackson headed up this interaction with occasional input from Daniel and Madison.

Daniel shared in his questionnaire that "I was just thinking about the problem in my head. Since I did not come up with a solution, I did not have to think about sharing." Maybe this was part of the reason why his input was more occasional than others.

Madison commented on her quietness during the debrief, but only when directly asked her opinion by another member from her organization. She said, "I didn't participate a lot because I'm not on the level where everybody else is." She also added, "I was looking

from a very different perspective… everybody has a different role. I was looking at it from the perspective of a student [worker] and an international student." Regardless of input levels, everyone seemed to be attuned to what is going on.

A transition occurred after a hypothetical chain of moves was suggested by Aiden. Mia replied to Aiden's suggestion saying, "Do what now? Wait you have to just act it out because that's stressing me out." The explanations had become too abstract. At this, the group began moving again and went into the failure outcome scenario (Fig. 4.12).

Then, Jackson gave a lucid explanation of the key to solving Traffic Jam, but everyone was talking at the same time when he says it. He said, "As soon as you get two people facing the same direction with no spaces, you're stuck." Daniel, Mia, and Aiden were all speaking at the same time, and the group missed Jackson's statement. In the debrief, Jackson said, "I probably should jump in sooner with the solution." It seems as though Jackson even realized he had the solution early, but something kept him from sharing it again after the group talked over him. Contrary to this, Jackson felt respected in this activity and attributed it to his longstanding status in the organization. He wrote, "I've been around long enough that people respect what I have to say." Perhaps if the group were listening they would have respected the value of Jackson's input. During the debrief, Mia agreed with another participant's comment that the group was open, willing to listen, and share. While this may have been her sentiment in the debrief, there was a definite time where the group's listening fell short, and the sharing was too much. The group moved on past Jackson's statement. They digressed into discussing whether the rules could be changed, thinking of loopholes, and asking the facilitator whether Traffic Jam could be solved at all. The group floundered in this state for several minutes.

In this languishing discussion where rules were clarified and reclarified, Mia tried something different. She stepped off to the side and began drawing on the back of a piece of

paper. Meanwhile, Aiden asked whether the facilitator knew how to solve Traffic Jam. He said, "Do you know? Like, you see a way we could do this, but you can't tell us?

Elijah replied, “Me? No.”

Jackson retorted, “What kind of a leader are you?”

Aiden said, "No, as in what?"

Logan said, "He knows the rules, but he hasn't solved it."

Aiden said, “You haven’t solved the puzzle yet yourself?”

Elijah said, “No, no.”

During this conversation, Madison joined Mia. Together, they looked at a piece of paper to discuss possible solutions. Meanwhile, Jackson noticed a chess set that happens to be nearby and began to use the pawns on it to model Traffic Jam. Aiden joined Jackson. During the debrief, Aiden says, “We felt like from our visual standpoint. It was hard to visualize seeing how the pieces move in the right order.” Perhaps Aiden viewed the chess set as a way to address this problem of perspective. Daniel and Logan continued to discuss the problem while standing on the squares. Now, three distinct groups of two had formed. Each group worked to solve Traffic Jam.

Elijah said, “What’s happening right now is really effective, breaking into individual teams. So, we’ve got three different teams going right now.”

Logan confirmed, “Three teams solving the same problem.” Logan described this entire scenario in the debrief as well. He said, "In our group, Jackson and somebody were doing the chess set, Mia and somebody were trying to draw in on paper, and I think me and Daniel were still standing on the squares just looking at it. We had three different groups looking at it in a different way, but each of us trying to solve the problem." Logan represented this division into smaller problem-solving teams as a strength.

Suddenly, Aiden exclaimed, “Oh! I think Jackson knows how to do it!”

Jackson had achieved the success scenario on the chessboard. Jackson then attempted to recreate his success a second time, but said, "Now I don't remember what I did though."

Aiden loudly suggested, "Should we all be watching what Jackson is doing?" Daniel followed him to watch the chessboard. Eventually, Logan comes to observe Jackson's work. Later Mia and Madison join. Slowly, the entire group came over to watch Jackson solve Traffic Jam using pawns on one row of a chessboard. Then Aiden cried, "Jackson figured it out! Can we do it?"

Mia said, "I told you he was the smartest one." She shouted, "Oh, I love you! Now how do we do it in real life?" Furthering this, in the debrief, Mia emphasized Jackson's value. After the activity, she wished Jackson "had been in the middle." In Mia's mind, the person who was able to solve Traffic Jam was best placed in the centre of the activity. The group reset, everyone back on their square. They made great progress (Fig. 4.15) but then made a move that put them in a failure scenario (Fig. 4.16). This was the most progress they had made so far. Jackson had taken a more significant role of leadership, and Logan seemed to be working with him to direct the group. Aiden was confirming moves, but during this Mia expressly said she doesn't understand the solution. She asked others to tell her what to do. The group reset, and Mia said, "We've got it, though. We've got it."

In Daniel's questionnaire, he surprisingly attributed this success to Elijah's suggestion. He said, "Elijah pointed out that we could use methods to model the problem. That lead to some out of the box thinking by the group." Despite Elijah's confusing facilitation style in the recording, Daniel felt Elijah's facilitation was helpful. Thankfully, the group was ultimately able to find a solution. Would they be able to enact it?

The group settled down, following Jackson's directions. Interestingly, Jackson stood a bit to the side to gain perspective of the group at this point. Mia noticed this and commented on it in the debrief. She shared, "When he got out of the line… then it was solved in like five

seconds." It seems as though this was an important element of Jackson's direction giving. Aiden, Mia, Daniel, and Logan all checked and double-checked each move. Madison was quieter and followed the group's instructions. Sure enough, the group solved the Traffic Jam. There were smiles on everyone's face, and Daniel, Madison, and Mia cheered loudly with applause.

United States Experimental Group Case-Half Observation Narrative

Participants in this group entered the room as their facilitator, Emma, spread the Traffic Jam squares further apart to allow enough personal space for each participant. They position themselves on the blue squares (Fig. 4.19) She greeted participants entering the room by saying, "Team winning, the winning team!"

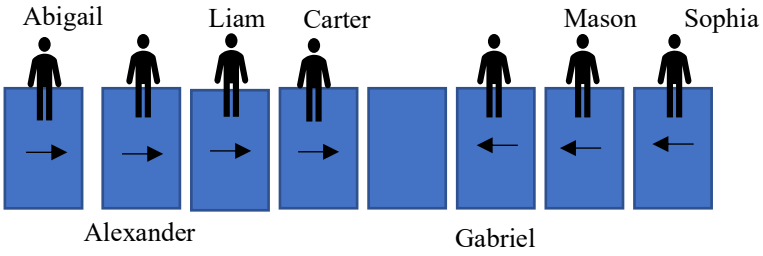


Figure 4.19 - U.S. Experimental Case-Half Starting Positions

The researcher said, "I like how this has turned into a competition."

Sophia said, if "Emma is in charge, it's a competition."

As participants walked in, Emma began sharing the set-up rules to the Traffic Jam activity. She said, "three of you on one end, four of you on one end. And you're going to be facing each other." Once everyone was set-up and standing on their squares, Emma gave the full explanation of Traffic Jam. To explain the activity, she instructed group members to demonstrate the legal and illegal moves. In addition to this explanation she added, "Here's something that I'm only going to tell you once, so listen carefully. I have some hints that I can provide you with, but I can only provide you the hints if you ask unanimously as a group. So, if any one of you chooses to be a hold out in requesting a hint, I cannot give the hint."

Alexander immediately responded, "Can we ask questions?"

Liam replied, “No” and shakes his head with a joking smile toward Alexander.

“No,” Emma agreed, though questions were certainly allowed in the activity’s design. She does change the tone a little when she added, “I can confirm or deny the rules as they apply, but I can’t give you any hints. But again, it has to be unanimous, ok?” Emma also decided to time the activity, changing the rules.

Abigail even said, “So she has already changed the rules” with a joking smile.

Incredulously, Emma replied, “I haven’t changed the rules I’m just adding a feature!”

Sophia, on the far right, asked, “So once we start, can we group up and start over?” Emma concedes that this was allowed. Alexander clarified whether all the hints could be asked for at once. Emma rejects this notion even though it was perfectly within the design of the activity.

Liam said, “You don’t want to try it first and then fail?”

Following this back and forth, the group started moving. Gabriel took a step forward, and then Carter jumped around Gabriel. Next, Gabriel stepped into the empty space which Carter vacated (Fig. 4.12). Abigail clarified whether only one person could move at a time. After a few further moves, this group began to realize that they would not be able to make any further legal moves. This sequence marked the end of the first attempt.

On their second attempt, the group realized an issue with their first sequence. Next, they realize that their only option was to begin with Gabriel stepping into the empty square. Next, Carter jumped around him. After that, instead of Gabriel stepping forward to occupy Carter's recently vacated space, Liam moved forward instead (Fig. 4.14 and 4.15). From this point, the group parsed out every move checking and double-checking to make sure they would not run out of legal moves. Liam and Alexander head up this discussion. Nobody moved without the approval of others. The group erroneously agreed with Liam's suggestion that Liam should move forward into a space just recently vacated by Mason. This move set

up a failure scenario again (Fig. 4.20) because two people were facing the same direction in adjacent squares after the beginning of the activity.

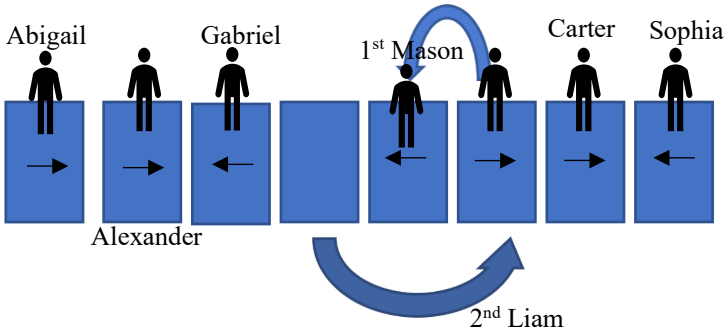


Figure 4.20 - Experimental Group, Second Attempt, Non-Immediate Failure Scenario with Two Facing Same Direction (Liam and Carter)

The group continued for a couple more legal moves and then realizes they have made a mistake in a different area. They eventually concluded that reset was required. After the reset, the failure scenario immediately occurred again. This time, the group realized they made a mistake at the point of Figure 4.16 without moving past it. Alexander again suggested asking for a hint, but the group did not respond to this suggestion. Another reset followed. With this new chance, the group immediately entered the Figure 4.12 failure scenario again. While resetting anew, Gabriel said, "There can never be two people from the same team [who] move consecutively, right? Or be close together?"

Reflecting on the failed attempts, Emma said in the debrief that the failed attempts were not demoralizing. Instead, she expressed that resets made her group feel this: "It was more of okay, we *get* to do this again." She emphasized the word "get" perhaps to indicate some enjoyment felt by the group. It did seem more likely that the group was genuinely enjoying the problem-solving activity. The tone of the room was light-hearted yet focused and engaged.

Liam's experience was more complicated than straightforward enjoyment in resetting. He disagreed with Emma in the debrief. He said, "It was a little more demoralizing. Like the first couple of times…. When like your first move out and you're like, 'Oh, wait, we got to

restart.'" Liam's attitude changed, because he added, "at the point where you're kind of like, 'Oh wait' I see what I did wrong. And the next time we're going to complete it because now I see the full pattern." Instead of feeling the privilege to reset like Emma, Liam encountered a shift from demoralization to confident comprehension for the subsequent attempt.

Carter did not seem to feel any disruption from the resets. He wrote in his questionnaire that “Nothing stalled. We failed, then began again.”

And this reset, Liam began to realize the problem. Mason did too. Mason said, "Then Liam is stuck, because Liam can't go through two people." Mason was referring to the situation where two people who were facing the same direction from the same team resulted in the failure scenario. The attempt following these insights reproduced the failure scenario in mirror: instead of getting stuck on the right (Fig. 4.20), the group got stuck on a move at the left.

Liam commented in the debrief that “for our group, I'd say, at least from my perspective, especially like the [attempt] before we completed. It was entirely just a perspective thing. Like [we] made a mistake because we weren't able to see the full picture overhead." It sounded like Liam wished he had been able to get an overhead view of the group to offer a better understanding of the activity. He continued, "Instead, I just made a wrong move, and then we're like, okay, we have to reset." He desired to approach the activity with an enhanced perspective but instead felt constrained to trial and error. Another constraint was expressed by Liam as well. Liam said in the debrief, “An interesting thing I think we had in our group is that Abigail and Sophia were on the very ends. And in a lot of ways both of them are kind of like, they’re older, more experienced leader types.” He clarified: "They had input, but they weren't the ones moving- at least early on. And so a lot of the problem solving ended up being more of the people in the centre." The constraints on

Liam's perspective were challenging, but here Liam further expressed the difficulty of missing other, experienced perspectives as well.

Emma seconded this by saying, "Well, they couldn't see!"

Abigail raised her hand to confirm. She said, "I couldn't see!" Later in the debrief, Abigail shared a development. She, the organizational leader, said, “I was deliberately trying to be quiet because I didn’t want to influence the group. I was going, ‘Abigail, keep your mouth shut.’ So there was some of that dynamic going on that I personally did.”

After saying this, Gabriel chimed in incredulously, "Who is going to tell Abigail to keep her mouth shut?!" This retort is met with laughter from the group. He cried, "It's not me!" Gabriel was somewhat new to the group. Whether Gabriel was truly uncertain about his interaction with the more experienced in the group would be difficult to know because he shared the comment in jest. Did newer members feel uncertain about how to interact with the more experienced members? A newer member of the group named Carter expressed uncertainty in his questionnaire. He said his uncertainty connected to his new status in the group.

Liam, having more history in the group said, "If [Abigail] was completely off, I’d say, 'Wait, wait.' I'm not going to tell her to be quiet, but I will say, 'Wait, wait wait.'" This is a fascinating statement. Abigail was aware of how her input might have affected the group and withdrew. Gabriel affirmed her heuristic, but Liam seemed to think that he could approach Abigail with feedback regardless. Liam also stated that Abigail and Sophia reserved some of their input as "a demonstration of how the group was already kind of close." He illustrated this by saying that Abigail and Sophia do not say, "Now we're the [leaders], listen to us, and we're going to do it this way."

Gabriel also remarked on this topic because he cited the value of people who "take a back seat to new ideas" in his questionnaire.

During the following attempt, Alexander noticed where the mistake that caused the failure in the prior attempt occurred. He said, "I should have moved here!" Alexander corrected the group's course. From that moment, Liam and Alexander called out directions while Abigail and Sophia double-checked their decisions. Liam and Alexander were the clear leaders, but everyone invested in the process. In the debrief, Alexander spoke of the importance of abilities matching the task. He said, "It is a very spatial task, so people who can spatially reason better than others were the ones saying things." He cited Liam as an example of having leadership in the activity associated with good spatial reasoning skills. Nevertheless, Alexander and Liam's leadership had room for Sophia and Abigail's checking of their moves.

Emma expressed the mood of the group in the debrief. She said, "I don't think there was any discomfort in the group that I had. I mean very comfortable with one another, and you know easily just worked together." Emma revealed the tone of the activity: calm discussion with everyone involved, solving the problem. Sure enough, on this attempt, they solved the Traffic Jam problem.

Liam felt similarly to Emma. He said he did not know how to answer several of the questionnaire questions because "we came in already working well together." Many of the questionnaire questions asked about uncertainty in the group, and Liam did not feel uncertainty about his group. Liam elaborated, "Everybody just kind of…, at least in our group…, was very open and willing to listen and share. I feel like." He continued, "It wasn't like anybody trying to talk over. Like saying, ‘Wait, no: we all need to do it this way’ or ‘Let’s just do something else.’ There wasn’t really arguing.”

Abigail gave an in-depth insight into Liam's observation. She debriefed, saying, "I think that is the value of a group that's been established. We solve problems every day all day long. So, a lot of those dynamics of having those conversations, throwing out the ideas,

knocking ideas down, and everything else we already do. So for us that was kind of natural for our time." She credited the smooth discussion of their group to the longstanding nature of their professional problem-solving work environment. Gabriel also affirmed the team's ability to work together because of their longstanding relationships as well.

While some in the group may have affirmed the positive relationships, Alexander expressed something different. He wrote in his questionnaire that "Emma yelled at me." It was unclear in the recording when this happened, but it must have been important to Alexander because it was the only response he shared in his questionnaire.

Sophia also confirmed group cohesion, saying, "Everybody stayed within character and was cooperative as expected." Sophia seemed to have an expectation of the team, which they all lived up to through cooperation. Sophia also expressed that the activity "was kind of fun because we don't normally do things like [it]. It was a real physical thing. We all do mental type things so being involved in stuff like that was pure physical." She also felt as though "It was a fairly straight path to the solution."

Gabriel felt that "everyone was quickly able to see the objective and move on it" too. This representation of the group aligned with the video recording. The group never even appeared frustrated, and there was a smoothness about the activity for them. Their process was very pragmatic, expedited, and peaceful.

United States Case Coding and Thematic Analysis Report

The thematic analysis of this group resulted in two main themes. The first theme was reflections about the group, and the other was reflections about the activity itself. This coding and thematic analysis report will explore those two primary themes.

United States Case Theme: Reflecting on the Group

Participants in this case shared their thoughts about the group itself. They wanted to make sweeping observations about the nature of the group. These observations included

statements about qualities in the group, status positions within the group, and comments about the longstanding co-working nature of the group.

Reflecting on the Group Sub-Theme: Group Qualities

In group qualities, the group made all sorts of observations about themselves. For instance, Mia shared, "I think as a whole, it's a pretty close group" during the debrief. Emma felt the same way. She said, "I mean [we are] very comfortable with each other], and you know easily just worked together."

Liam refined this comfort motif by saying, "Everybody just kind of, at least in our group, [was] very open and willing to listen and share."

Gabriel commented on the group's problem-solving ability instead. He shares, "Everyone was quickly able to see the objective and move on it."

Some people just felt confirmed in their opinions about the group. For instance, Sophia wrote, "Everybody kept interacting with each other. I didn't detect any uncertainty." She also wrote, "Everybody stayed within character and was cooperative."

Another person who fell into this category was Daniel. Daniel shared that he saw that "there was a steady group conversation" on his team. Daniel was simply aware of a steady conversational tone in his group.

Participants had a spread of things to say about the group. These comments included positive, negative, and neutral statements. The critical element of this theme was that participants focused their attention on making comments about their group's qualities as a unit.

Reflecting on the Group Sub-Theme: Status in Group

Another thematic element that emerged under group reflections associated with strata of status in the group. Abigail, a leader in this case's organization, remained quiet. She explained her decision in the debrief when she said, "I don't want to influence the group… I

was going 'Abigail, keep your mouth shut.' So there was some of that dynamic going on…" Abigail was in charge of this team, and she wanted to allow others to have the chance to hold decision making power. In doing so, she had to consider her own status within the group.

Much of the discussion about status in the group was brought up by Liam's comment. He said, "The other interesting thing I think we had in our group was that Abigail and Sophia, were on the very ends. And in a lot of ways, both of them are kind of like: they're the older, more experienced leader types." Abigail and Sophia were both women of higher age and experience. Liam had to pass a line of taboo in order to address this item of status, but the point was important enough for him to want to express it.

Gabriel, a newer member of the case group, joked at the experienced leader Abigail. He said, "Who's gonna tell Abigail to keep her mouth shut?" His jest communicated that it would be far-fetched to oppose Abigail's status. Mia also indicated that she was a newcomer with only a week of experience within the team, while Carter described himself as "fairly new."

Liam was more of an intermediate status member. The reason it was possible to think of him this way was due to his comment when he said, "If [Abigail] was completely off I'd say like, wait wait wait. I'm not going to tell her to be quiet, but I will say wait wait wait…" He was expressing that he has the capability to disagree with Abigail's experienced leadership gently. Instead of responding like Gabriel, Liam responded slightly more boldly, indicating a higher status.

It was evident in this group that status was on participants' minds. Some were referred to as experienced, while most who were new took that title upon themselves. Finally, a suggestion was made that indicated an intermediate status. These new, intermediate, and experienced status levels were part of the reflections that participants made about their group.

Reflecting on the Group Sub-Theme: Longstanding Team Relationships

The final sub-theme developed around a shared sense of group history. Many of the questionnaire items asked about group uncertainty. Liam expressed incongruence between the questionnaire and his experience with the group. He shared in the debrief, "Like, answering a lot of the questions it was kind of like, I don't exactly know how to answer this because… we came in already working well together."

Sophia observed that "Everybody stayed within character and was cooperative. As expected." This demonstrated that she had an understanding and an expectation of the roles people play in this group. It takes time to build these sorts of expectations.

Logan felt similarly to Sophia. He wrote, "We had a pretty good understanding of who was capable of what going into it." In Logan's mind, he already understood this group and their capabilities.

Gabriel, although newer, expressly stated, "The group has been together for a long time. Therefore we work together well." Even a newer member of the group had adopted this theme of longstanding team relationships. Not only has he observed this element of the group, but he had also connected it with the ability of the group to work together well.

Abigail elaborated on the benefits of a group that had been together for some time. She said, "I think this is the value of a group that's been established is we solve problems every day all day long... A lot of those dynamics of having those conversations, throwing out the ideas, knocking ideas down and everything else, we already do. So for us that was kind of natural…" Abigail shared that from her view, the group's coworking history allowed them to develop the ability to have critical conversations with each other for problem-solving. Phrases like those shared above were coded around this group's previous history together. Through the thematic analysis, the theme of previous, longstanding team relationships arose as participants described the group.

Overall, the group observation theme arose because this group made many comments about their collective self. They made observations about the nature of the group. They also indicated different strata within the group. Finally, they made comments about the longstanding nature of the team and what it represented. In summary, this group observed themselves as a whole.

United States Case Theme: Reflecting on the Activity

The other major theme for this group came from their reflections on the activity itself. Activity reflection codes mostly came from three sub-themes. The group identified things that were hindering their progress. Counter to the difficulties that arose, they also shared their thoughts about the different approaches used to discover Traffic Jam's solution. The third sub-theme that arose came from participant comments about the activity itself.

Reflecting on the Activity Sub-Theme: Hindrances

There were several things that participants identified as hindrances during the activity. For instance, Aiden pointed out that "We just felt like from our visual standpoint, it was hard to visualize seeing how the pieces move in the right order." For Aiden, there was a simple, visual hindrance.

Liam felt similarly, but he added that he would have appreciated an overhead view of the activity. Regarding challenges during the activity, he said, "For our group, I'd say… at least from my perspective, especially like the one before we completed it was entirely just a perspective thing. Like made a mistake because [we] weren't able to see the full picture like overhead…" Liam felt as though in a critical moment toward the end, a lack of physical perspective was a hindrance. It sounded like he wished he had the view of the group from above.

Mia shared a different challenge. She cites that the group "didn't even try to go through the whole thing. We did the first two steps, and we're like no. We knew this was not

going to work." For her, a hindrance to solving the activity came from not playing out failure scenarios completely. Participants would often realize a reset was required after reaching failure scenarios from Figure 4.12 or Figure 4.16. Recall that Figure 4.12 and Figure 4.16 both allow for legal moves; they just indicated that failure was imminent. Mia felt as though these failures should have been fully played out until there were no more legal moves. She thought that this would have been helpful.

Liam also expressed another dimension of difficulty introduced to the activity. He cited that "Abigail and Sophia" were on the very ends. And in a lot of ways, both of them are kind of the older, more experienced leader types." Liam felt as though the physical positioning of the group's experienced members at the ends of the line made the activity more difficult as well.

Mia confirmed this in the other half of the case. She cited a problem associated with Jackson. Recall that Jackson solved the Traffic Jam in Mia's group. Mia shared afterward, "Because Jackson was on the end, if Jackson had been in the middle" in the debrief conversation about difficulties during the activity. Some group members had something helpful to offer, but their placement on the ends of the lines introduced some difficulty.

Abigail said that for her, the difficulty was a visual problem. She shares, "I couldn't see!" during a discussion in the debrief about the challenges during the activity. Visual perspective was an issue for her.

Jackson had the same problem. He said, "All I could see was the back of the person in front of me."

There were some identified hindrances to discovering the solution in the activity. Most of the hindrances for the group involved matters of visual perspective. Some people like Liam wanted a bird's eye view of the activity, while others simply could not see. Another theme that arose was that valuable input remained difficult to access at the edges of the

activity. All of these themes about difficulties or hindrances within Traffic Jam fit into the overarching theme about activity observations.

Reflecting on the Activity Sub-Theme: Solution Approaches

While many hindrances to the activity were shared, so were thoughts about the problem-solving process involved with Traffic Jam. Emma shared a simple observation, “It took more than two tries.”

While this seemed like a simple observation, Liam saw it too. Liam said, "When like your first move out, and you're like, 'Oh, wait, we got to restart." Perhaps participants needed to go through the realization that a restart was required to achieve the solution and that mistakes were going to happen. Maybe they expected to complete the activity without needing more than one try? Liam clarified this process a bit. He shared about a moment where he said to himself, "Oh, wait. I see what I did wrong. And the next time we're going to complete it because now I see the full pattern." There appeared to be a theme in this process. Participants realized the activity involved failure. Traffic Jam also involved a realization process in failure that led to a clearer understanding.

Mia felt the need to understand the entire process to reach the solution as well. First, she set the context by saying, "We didn't even try to go through the whole thing. We were like the first two steps and were like, no. We knew this was not going to work." Mia was showing that making two moves and discovering failure only allowed the team to view part of the process. Then she shared, "We just tried to figure it out as a whole, versus step-by-step. And then we figured it out as a whole versus let's go step by step." This approach intending to understand the whole activity rather than just a piece of it was helpful in her mind as well.

Another method that seemed valuable for solution discovery came from Logan. Logan shared about the three teams that formed in his activity. He said, "In our group, Jackson and somebody were doing the chess set, Mia and somebody were trying to draw it

out on paper, and I think me and Daniel were still like standing on the squares just looking at it. All three, like we had three different groups looking at it in a different way, but each of us trying to solve the problem." Logan valued dividing his team into smaller, problem-solving units. Ultimately, this worked too: this is how the group arrived at the solution.

Jackson's take on the situation was different. He shared, "I was just thinking [about] the problem in my head." For some, solution discovery involved division into smaller teams, but for Jackson, it was more of an internal process.

Participants generated various codes about solution approaches in this case. They realized Traffic Jam involved failure and reset. This ultimately led to further realizations about the pattern required for Traffic Jam. Another participant identified the importance of smaller problem-solving teams within the group while a final participant shared their internal process as a part of solution-finding. Discussing the way to finding the solution was a key sub-theme relating to the many reflections participants had about the Traffic Jam activity.

Reflecting on the Activity Sub-Theme: Observations about Traffic Jam

The final sub-theme under participant reflections on the activity involved general observations about the Traffic Jam activity itself. Sophia shared, “It was a real physical thing.”

Alexander said, "This is a very spatial task, so people who can spatially reason better than others were the ones saying things." He noticed that the task required spatial reasoning skills and suggested that those who were confident in spatial reasoning would excel at this task.

Emma said, "I actually thought it was going to be easier to solve than it was." She was surprised by the difficulty of Traffic Jam. She added, "Just looking at it; it seems as though it should be relatively easy to do."

Participants commented on the reset element of Traffic Jam as well. Aiden said, "We messed it up and had to go back to the beginning." Aiden saw that resetting was often required to solve Traffic Jam.

Liam confirmed this when he said, "I just made a wrong move, and then we're like, okay we have to reset." Participants had to grapple with the reset element of Traffic Jam.

Understanding components of Traffic Jam itself was crucial in solving it. This group made observational comments about the activity. In this theme, participants discussed the physical and spatial factors of the activity. Another participant raised the point that Traffic Jam was surprisingly or deceptively difficult. One key element of the activity was the realization that resets were a part of the experience.

The participants within this case had many comments about their experience in the activity. They shared about circumstances that hindered progress toward the solution. They also shared about the avenues they took to find the solution. They connected both hindrances and paths to the solution with observations about Traffic Jam itself.

United States Case Summary: Vignettes and Themes Comparison

United States Case Vignettes

United States Control Group-Case Half Vignette

This group of six had a facilitator who opened the activity by explaining Traffic Jam to his participants as if they three-year-old children. He had participants act out the rules. Later, the facilitator shifted his approach by offering hints confusingly and cryptically. Some from this group felt connected due to a history of working together; however, one person was new to the team, and another was an international student mixed in with full-time employees. Participants forgot each other’s names multiple times. Additionally, one participant felt especially devalued after being grabbed and insulted by a teammate. This group repeated failure in line with Figure 4.12 and Figure 4.16. They reset without playing out every legal

move, realizing failure was imminent before actually failing. For at least part of the activity, they did not realize they had the option to reset. When they realized they could reset, they did not find motivation in resetting. The group expressed a sentiment of competition against the other half of their case. There came a moment where some in the group thought Traffic Jam was impossible, and the group fractured. This fracture eventually led to a split into three separate problem-solving groups of two: one group drew the activity on a piece of paper, the other group stood on the blue squares, the final group used a chessboard to model the problem. One participant clearly expressed the answer to the activity long before the problem was solved. The group missed it because they were talking over him. The group did not realize one person knew how to solve Traffic Jam until he demonstrated the solution on the chessboard. Once the group saw the solution, the person who discovered the solution directed the team to success while most of the team checked his direction.

United States Experimental Group Case Half Vignette

The facilitator of this group started the activity by suggesting it was a competition against the other half of their case. The facilitator instructed participants to demonstrate the rules to Traffic Jam. This group consisted of employees who had longstanding co-working relationships. The two most experienced members of the group stood on the far left and right ends, while two others headed up the discussion of the activity. The outside positioning of experienced team members created added difficulty for some participants who missed their input. Part of the reason an experienced group member inputted less was to avoid dominating the activity because of her status in the organization as a leader. Everyone participated in this team. This group repeated failure (Figs. 4.12 and 416), but ultimately viewed the resetting process as motivating. The facilitator suggested that there was the option to request hints at the beginning of the activity unanimously. While some suggested taking the option, there was never enough unanimous support to receive the hints. This group discovered that they would

fail before running out of legal moves after entering into a failure scenario. One participant discovered the solution early, but the group did not immediately adopt the advice. Others had to understand the solution for themselves before the solution could be applied. There was a smooth, methodical feel to this group. When more participants understood the solution, two people directed the team to accomplish the task. Every team member checked their directions.

Summary of United States Case Themes

This group seemed to have two thematic foci that emerged from their triangulated data. This case commented upon the group and the activity back and forth. They consistently discussed these two dimensions. Perhaps this was due to their longstanding history as a problem-solving team. Within this longstanding history, strata of status had also formed in the group. The group not only made observations about themselves, but they also made observations about Traffic Jam. They identified hindrances toward the solution, they identified the process of reaching the solution, and they made comments describing the activity itself. The participants in this case assessed the Traffic Jam activity as well as themselves throughout the experience.

4.3.2.3 Hong Kong Case Findings

Hong Kong Case Demographics

This case was observed at a college on Hong Kong island. This college focused on accepting students with difficult circumstances and aimed to prepare them for vocational careers or to give them second chances on academic endeavours. This case had 15 participants. Two participants served as facilitators. The Facilitators served as staff at the college. The control activity included five students and two additional staff members. The experimental activity included six students. Students and staff spoke both English and Cantonese; however, Cantonese was the most comfortable language for everyone. The

activities took place entirely in Cantonese, and the debrief happened in a mixture of both languages.

Researcher Journal on Hong Kong Case

Following this activity, I made a record about this group's demographics first. I wrote, "[The students] were form five and six students who were in the completion phase of their college career." I also commented on their language skills. I wrote, "Some had very good English skills when it came to speaking, but the participants were mostly speaking Cantonese throughout the activity."

I remarked specifically about the control group: "The control group in this iteration drew a detailed diagram outlining all the steps to reach success and then followed each step to solve the puzzle." I remember being impressed by this technique as it was the first group I had seen during the entire study to complete the activity this way. I also added, "It took a while, but they did it." While creative, it was not the fastest method to find the solution. I also noticed that “one lady was using her phone the entire time, but I was unsure whether she was actually disengaged." She seemed to be engaged and yet seemingly disengaged simultaneously.

When it came to the experimental group, I wrote, "The experimental group was just focused on their tiles and seemed to complete the activity more experientially." I failed to save many remarks about this half of the case, but I'm unsure why. Perhaps my lack of comments about the experimental group can be attributed to nothing standing out to me about their group at the time. Additionally, I was so impressed by the diagram in the other group that it took all my focus for the journal entry.

Observation Narratives of Video Recorded Activities for Hong Kong Case

The activities for the Hong Kong case study were rendered differently than the United Kingdom and United States case studies. A very gracious gatekeeper provided an additional

expert observer's viewpoint. Her view is blended with the researcher's view in these observational accounts. This gatekeeper was a Hong Kong native and fluent Cantonese speaker. She also spoke English, having completed her master's level studies in the United States. She worked together with the researcher, studying some of the theories involved in MLGLS while at university in the United States. These credentials show she was incredibly well-suited to offer subject-matter expert observations for the Hong Kong cases. Additionally, the researcher has a Western interpretation bias, which is out of context when approaching Hong Kong. This research can draw from the expertise of the observations offered by a cultural insider who also knew the theories behind this study. Therefore, the accounts of the control and experimental activities include the gatekeeper's observations and the researcher's observations. While the researcher reported on the physical movements in the activity, the gatekeeper offered additional insight to what was taking place. Where participant input was included in these observations, it came from either their own English responses or their translated Cantonese responses due to the mixture of languages used during this study. This research took a further step in this case to ensure trustworthy observations. Once the researcher wrote the observation narrative, the gatekeeper read and checked it. The gatekeeper made sure the researcher developed an accurate description of the case. After checking it, she wrote, "I have read through the whole observation. Everything is fine and described in detail, clearly. I have nothing to amend." She added, "Wow, I wonder how many times you have watched the video to complete the task." Hopefully, this candid statement depicted her approval of the observations rendered for this case. The result allowed for two richly descriptive narratives depicting both activities in this Hong Kong case.

Hong Kong Control Group Case-Half Observation Narrative

Huo Delan, a teacher at the college, facilitated this activity. Huo Delan's group stood around until he invited them to take their places on the squares. Huo Delan explained the

rules to the group. He also had one person in the group act out the legal moves. Then, he answered clarifying questions during this demonstration. This group was different because it included a mixture of college staff and students. The two staff members position themselves on opposite sides of the empty, beginning space. On the left was Ding Ruogang and on the right of the space is Fu Lei (Fig. 4.21).

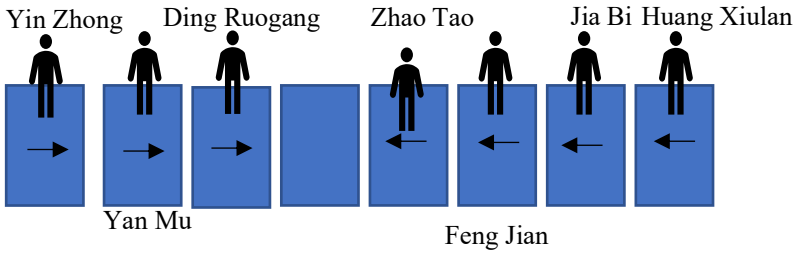


Figure 4.21 - H.K. Control Group Case-Half, Starting Positions

Once the explanation of Traffic Jam was complete, the group began. Ding Ruogang stepped forward. Fu Lei jumped around him. Ding Ruogang stepped into the empty space, which Fu Lei just vacated. They were both facing away from the empty space with the empty space in the centre. They immediately went into the initial scenario that produces failure (Figure 4.12). The group continued using their legal moves exploring the result of this failure scenario. The group eventually decided to reset.

On their next attempt, more progress was made. At this point Feung Jian, a student, became very involved with the discussion between Ding Ruogang and Fu Lei. The group made it to a good point (Figure 4.14), but then Huo Delan intervened. As a result, the group went back to their starting positions again.

Huo Delan gave a long explanation to the group before allowing them to start again. Upon this reset, Feng Jian stepped out to observe. He gave passionate input into the situation as he watched the group. Feng Jian's statement brought Yin Zhong into the conversation, who was on the far-left end of the line. Huang Xiulan and Jia Bi on the far right were paying

attention, but were not offering much input. After much deliberation, the group again proceeded to a scenario that would eventually result in a reset (Fig. 4.12). During this failure scenario, Yan Mu became more involved and pulled out a pen and paper to draw a model of the activity. Yin Zhong, Ding Ruogang, Fu Lei, and Feng Jian remained the most involved with the discussion. Ding Ruogang and Feng Jian often stepped off the squares to gain a different perspective of Traffic Jam. Some in the group grow interested in Yan Mu's work. Fu Lei stepped off the line now too to gain perspective. Jia Bi and Huang Xiulan remain at the far right, quiet but attentive.

At this point, everyone except for Huang Xiulan walked away from the line. Their attention was drawn to the chalkboard. They begin to draw a model of the Traffic Jam activity (Fig. 4.22). Instead, Huang Xiulan stared intently at the squares as she remained standing next to them. While Yan Mu had walked toward the chalkboard, his attention remained fixed on the squares. The rest of the team invested themselves in drawing on the chalkboard. Huo Delan suggested that Yan Mu get involved with the discussion on the board but does not offer the same suggestion to Huang Xiulan. The group discussion carried on and develops.

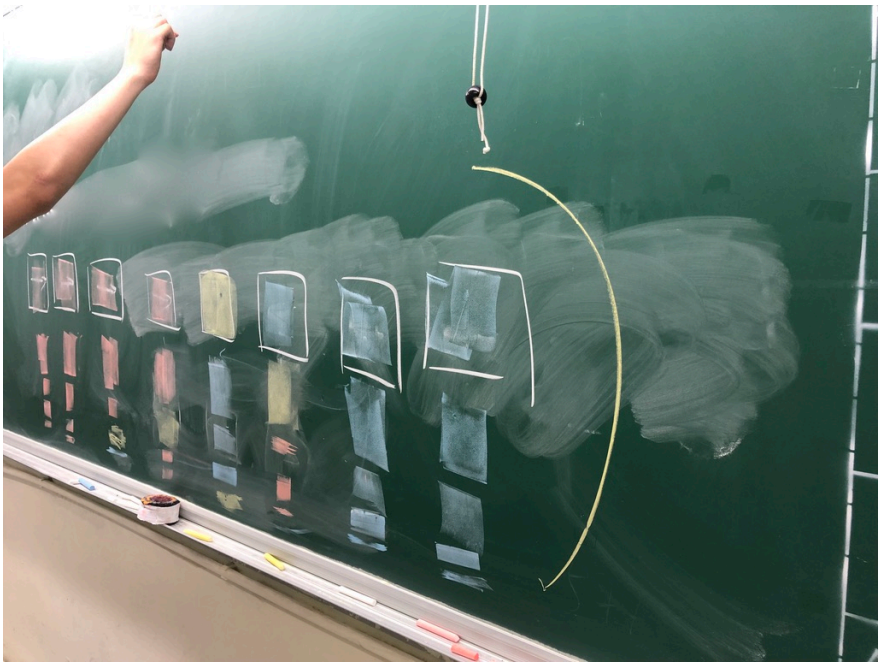


Figure 4.22 - H.K. Control Group Case-Half Chalkboard Diagram

Yan Mu turned around and began to look at the squares again. He lost interest in the excited discussion around the chalkboard. Huang Xiulan invited him over to practice moves with her on the squares. He shared in the debrief, "It is hard to cooperate with the whole group, and there is seldom teamwork. I am afraid that this task may not be really hard to some people but may be hard to some people since different members may have different perceptions of the task. That's why I chose to do it on my own." Yan Mu's viewed his choice to work with Huang Xiulan as independent, and he viewed working with the rest of the group as not independent. Yan Mu definitely understood a difference in perceived difficulty towards Traffic Jam. Curiously, he considered joining Huang Xiulan rather than choosing to work on his own. Elsewhere in the debrief, he shared that it was important "to help each other and to cooperate with each other." It appeared that he experienced both aspects of a group during this activity: individuality and communally.

So, Yan Mu and Huang Xiulan began to collaborate. Huo Delan then joined their discussion, offering clarification on the rules. The discussion at the board had wavered, now Ding Ruogang and Fu Lei had re-joined the squares. The gatekeeper observed this split in the group as well. She wrote, “The group is automatically divided into two small groups [within] in each group. One group is trying to draw all the squares in colour, and [the other] attempts different possibilities with different steps.” The gatekeeper also observed that Huang Xiulan and Yan Mu were the general leaders of the sub-group standing on the squares. There was a back-and-forth interest for some toward the chalkboard approach and those standing on the squares. In both camps, lively discussion was happening.

Feng Jian was working at the chalkboard. He shared in the debrief that “There would be different opinions in teamwork. Enough though having more people meant more opinions, it did not mean that this really helped solve the task. Sometimes more opinion makes the task more difficult to settle." Perhaps this split helped Feng Jian think more clearly than when the

group worked together. Fen Jian had to listen to fewer differing opinions as a result of the group dividing into two.

Ding Ruogang walked away from the squares for a phone call. Yan Mu, Fu Lei, and Huang Xiulan remain next to the squares. At this point, Huang Xiulan ably directed Yan Mu, Fu Lei, and herself through the correct first three moves (Fig. 4.14 and 4.15). Ding Ruogang returned from his call and continued to assist the group. However, this group's momentum fizzled into separate conversations. During this time, Ding Ruogang and Fu Lei watched the chalkboard for a moment. These four then return to the squares, playing out another practice run. They set up with three people to the right of the blank square and one person to the left of it to practice their sequence. They practice a couple of times.

At this point, the group working at the board had drawn a large, colourful diagram depicting a step-by-step plan. The entire room slowly focused their attention on the diagram. The group standing on the squares watch from afar. The group making the diagram has made such progress that everyone is waiting for them to solve it. Ding Ruogang joined the chalkboard group again while Yan Mu, Fu Lei, and Huang Xiulan watched from afar. As the three waited from a distance, they continue to think about the activity by making moves on the squares. They produce the failure scenario depicted in Figure 4.16.

Yin Zhong, who had been deeply involved in the chalkboard diagram, smiled and ran to her place on the squares. Feng Jian and Jia Bi continued to work at the board. Ding Ruogang took his original place in line as did Ding Ruogang and Fu Lei. Now, everyone who was standing on the squares was pointing at the diagram on the board and discussing it.

Suddenly, Feng Jian and Jia Bi put down the chalk with a clap on the chalk tray. They moved back to the line dusting their hands of chalk. The researcher re-entered the room to observe the completion of the diagram. The gatekeeper observed this transition by writing,

“Then [the group] officially starts to attempt the task together with [rest of the] group when the researcher came into the room.”

The order of individuals on the squares was different now. Feng Jian was to the right of the empty square, and Jia Bi was to the left of it. The activity began with the first move made correctly (Fig. 4.11). The next move was correct (Fig. 4.14). The gatekeeper notes that "Ding Ruogang organised the group to follow the plan the students wrote on the blackboard.” After the first couple of moves, Ding Ruogang assumed a direction-giving role; however, everyone seemed involved in double-checking that the group was following the model. For the third move, a more extended exchange occurred, with participants making several gestures toward the chalkboard. Jia Bi and Ding Ruogang lead this interaction as they were both facing the open square. They chose the correct move (Fig. 4.15). Participants methodically checked each subsequent move against the diagram on the chalkboard. Yan Mu made a wrong move accidentally, but Ding Ruogang noticed that Yan Mu’s move did not match the diagram. Ding Ruogang corrected this error. Slowly, step-by-step, they reached the solution. The gatekeeper wrote, “They finished the task in three minutes after they decided the whole plan. They wrote on the blackboard, and they did not ask any questions or hints at all.”

The group was so proud to have discovered the solution without hints based on the gatekeeper’s observation. Huo Delan, the facilitator, shared in the debrief, “I forgot to tell them they can ask for hints.” He continued, “They just had their plan and already did what the hints include automatically.” While the gatekeeper shared that the group may have known about the hints, Huo Delan expressed that he forgot to share the hints because the group discovered them on their own. While debriefing, Feng Jian and Jia Bi suggested that they did not think that receiving the hints would have made any difference anyway.

HONG KONG EXPERIMENTAL GROUP CASE-HALF OBSERVATION NARRATIVE

A different teacher at the college named Ren Chao facilitated this experimental group doing Traffic Jam. Ren Chao began by explaining the rules to his group of six students, three men and three women. They were seated while he explained the legal moves, some students were more focused than others. Ren Chao demonstrated the legal moves to his group as they watched. Lang Hai asked questions of Ren Chao while he explained. After explaining the legal moves, Ren Chao explained the illegal moves for Traffic Jam. This time he asked Gao Lexi to help him demonstrate. The gatekeeper shared how the transition from Ren Chao's explanation to the group's attempts happened. She wrote, "Then, when Ren Chao tries to help them clarify the instructions, but Lang Hai expresses that he is clear about the rules and stops the facilitator to go further." Following this interruption, the group took their places on the squares. The three women selected their spaces on the left, and the three men choose the spaces on the right (Fig. 4.23).

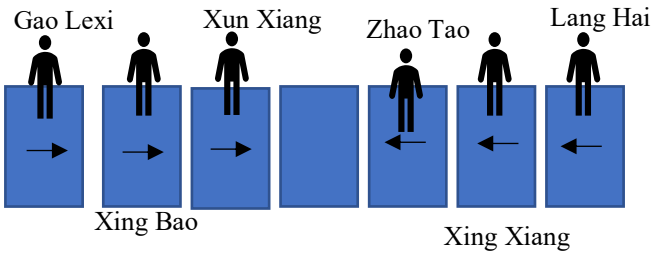


Figure 4.23 - H.K. Experimental Group Case-Half Starting Positions

Immediately the group moved into a failure scenario (Fig. 4.12). Xun Xiang stepped forward into the empty space, and Zhao Tao jumped around her. Xun Xiang steps forward again, leaving both with their backs facing the empty space. The facilitator asked them to reset. On the next attempt, the group ends up in the same failure scenario (Fig 4.12); but this time, Lang Hai directed Xun Xiang to step forward instead of Xun Xiang doing so himself. Lang Hai takes a direct supervisory role from this point forward, directing his teammates one by one until he realized they must reset.

On the next reset, Lang Hai realized the mistake. Instead of asking Xun Xiang to move forward after Zhao Tao jumped around her, he instead had Xing Xiang move forward. This sequence showed progress. The group continued for two more moves, and they find themselves in a failure scenario (Figs. 4.14, 4.15, and 4.16). They reset again.

On the next reset, the group repeated the original failure scenario (Fig. 4.12). Lang Hai was still very involved, but both Zhao Tao and Xing Xiang had grown more interested in checking Lang Hai's decisions. Xing Bao and Xun Xiang remained quiet and followed instructions. Gao Lexi offered some input, though. A reset happened again, and the group entered the failure scenario again (Fig. 4.12). The gatekeeper also noted the repeated failure, three attempts at this point. The repetitive failure did not seem to bother the participants. Lang Hai and Xing Bao both emphasized the importance of continuing to try again. Lang Hai said, "You just try so many times." They both appreciated the importance of trial and error in problem-solving.

The gatekeeper additionally observed, "Lang Hai is the key person to lead the group." The group began at this point to break some of the rules to experiment. They moved backward and made illegal moves while having a discussion. Gao Lexi and Xing Bao were much more involved with the discussion now. After this discussion, they reset.

Following this reset, the group again entered into the original failure scenario (Fig 4.12). This time the gatekeeper observed, "They get stuck in their fourth attempt, and Zhao Tao suggested that they just move the square to the back to make the task done. Then the whole group laughs, having fun." There was a light-heartedness in the failure. At this point, the gatekeeper identified both Zhao Tao and Lang Hai as "[playing] the key role in leading the group. The whole group is attentive to follow them." Some discussion about the mistake followed, and the group attempted more hypothetical strategies without following the rules.

The group decided to play out the failure scenarios until they ran out of legal moves to try to discover the problem.

The facilitator offered the option of receiving hints unanimously. The gatekeeper observed the reaction to this: "Xing Bao refuses to get the hints from the facilitator." Despite the hints being made available, Xing Bao did not want them.

Although in the debrief, Zhao Tao asked, "What are the hints?" So there was undoubtedly some curiosity about what the hints were.

Xun Xiang gave her thoughts on the unanimity aspect associated with hints during the debrief. The researcher asked whether anyone in the group thought that unanimity would impact the activity. Xun Xiang said, “I think it depends on whether we know each other or not.”

Speaking of relationships, Gao Lexi wrote this in her questionnaire about her relationships with others in the group: "Generally, it's good." Maybe relational currency impacted the group’s decision about asking for hints. Xun Xiang certainly thought it influenced the group’s ability to act unanimously to receive those hints.

Back to the hints, Lang Hai confirmed, “We did not ask for or use any hints to complete the task.”

In the debrief, the gatekeeper said, “They didn’t want to have hints.”

In response to this conversation about hints, Lang Hai opened up about his leadership philosophy in this activity. He shared, "I think, in all the games, you can find one leader to lead. All games are the same." He clarified, "So I think, we don't need the hints."
Instead of receiving hints, the gatekeeper observes, "The facilitator gives the instructions one more time, then they have their fifth attempt." After some discussion and input from the facilitator, they reset again.

This time, they again found the failure scenario depicted in Figure 4.16. The group consistently revisited the failure scenarios in Figure 4.12 and Figure 4.16. Once during these failures, Lang Hai walked up to the board and drew something to discuss with Ren Chao. Lang Hai asked if the squares should be moved into a circle: if the solution was a trick. Ren Chao clarified Lang Hai's question with the researcher. The researcher said, "No, no, it's not a trick solution." He encourages the group saying, "It is possible, I promise."

The group resets. They hesitate this time. Lang Hai "stands out from the group and tries to check for the steps the group should attempt" according to the gatekeeper. Despite Lang Hai's direction giving, the group immediately proceeded into the failure scenario (Figure 4.12). After some conversation, a long moment of silence followed.

Gao Lexi connected not speaking with uncertainty when she wrote, “Some group members did not speak at all.” The question that received this response asked whether a participant noticed others’ uncertainty about interacting.

Xun Xiang also noted an indicator of uncertainty when “Not everyone gives [their] opinion.”

Gao Lexi also expressed that a stall “just happened [during] a moment of time.” Could this be the moment she was referring to when everyone was silent?

Zhao Tao began drawing on the board with chalk to think about Traffic Jam. The gatekeeper also noticed this and wrote, "Zhao Tao tries to write down the steps on the blackboard." The rest of the group continued to stand on the squares being directed by Lang Hai as Lang Hai tried to solve the problem. A stand-in came to replace Zhao Tao, a teacher. The gatekeeper shared, "Lang Hai invited another teacher assistant to join the group." She continues, "By standing outside the group, Lang Hai sees all the movements clearly, and then they complete the task successfully." This positioning indeed allowed Lang Hai to correctly

direct the group to a solution (Fig. 4.14 and 4.15). Xing Xiang also added some input that helped lead to the solution. Everyone clapped and cheered! Someone cried out, "Woo hoo!"

The group was so happy they replicated the solution with Zhao Tao back in the line: the gatekeeper said, "The whole group is glad to attempt one more time." The gatekeeper said that the group repeated the activity because "Zhao Tao asks if they could do the task [again] for his reference." This time, Lang Hai was standing outside the line, confidently directing each person to go to the correct place to complete the sequence. The group almost made some mistakes, but they quickly self-correct to replicate their success with Zhao Tao. Ultimately, as the gatekeeper wrote, "The whole group is happy that they all know how to solve the task."

Hong Kong Case Coding and Thematic Analysis Report

Two primary themes emerged in this case. The first theme emerged around influencing variables that could change the Traffic Jam activity. Participants discussed different factors which might change the experience they had. The second theme that emerged came from participant comments about positive group processes they observed.

Hong Kong Case Theme: Influencing Variables to Traffic Jam

Influencing Variables to Traffic Jam Sub-Theme: Influences from Hints

The first variable in this theme discussed how hints and unanimity affected the group. The control group facilitator admitted that he forgot to give hints, and questions about the value of hints and unanimity follow. When asked whether the hints made any difference in the activity, Feng Jian and Jia Bi both said no. Huo Delan, the facilitator of the control half of the case, said that "I did not tell them that they can ask for hints. During the activity, they just have their plan and already do what the hints include automatically." This statement matched the observation: the control group discovered at least two of the hints on their own. Lang Hai also expressed that his group "did not ask and use any hints to complete the task." When the topic of unanimity came up, Lang Hai and Jia Bi both felt the dimension of unanimity would

make no difference in completing the task. Participants considered that hints and unanimity would not to affect the activity.

Influencing Variables to Traffic Jam Sub-Theme: Demographic Influencers

Another influencing variable that the group considered had to do with demographics. Lang Hai wondered how a group of wealthy individuals would fare in a Traffic Jam activity. He shared, "Rich people seem to be having their own thinking. Will rich people have their special mentality and make them perform differently when completing the task?" Lang Hai hypothesized whether different social groups might demonstrate different patterns of solution-finding in Traffic Jam.

Feng Jian wondered about a different demographic. He shares, "I would like to know will this study apply to criminals [differently] than students." He also said, "I would be interested to know, would there be some specific findings if this study applied to people in the undeveloped countries. As those people may be more submissive and may not be used to giving their own opinions." Feng Jian also wondered how a group of murders or a group of mentally-ill participants would complete Traffic Jam. Feng Jian had many hypothetical populations he would have liked to explore to see what differences exist across demographic groups.

The gatekeeper herself showed a curiosity for this theme. She asked if the research "finds any differences from different countries." Even the leaders at the college were interested in differences that could arise through demographics.

Influencing Variables to Traffic Jam Sub-Theme: Group Size

The final variable discussed that might change the Traffic Jam activity is group size. Lang Hai said, "With more people [the activity] is the same." Lang Hai seemed to think the dynamics of the activity remain constant, depending on group size.

Later on in the discussion, Feng Jian shared that his opinion was different. He said, "Even though having more people may have more opinions, it did not mean that this really helped to solve the task. Sometimes more opinions make the task more difficult to settle." Feng Jian recognized that more people involved in an activity resulted in more ideas. Feng Jian said that this was not necessarily helpful because more opinions make it more difficult to agree upon a solution. There was a difference of opinion about whether group size affected the Traffic Jam activity, but it was a thought that came across at least two participants' minds. Overall, there were many ideas about influencing variables that might affect Traffic Jam. The primary variables raised were the influence of hints, demographic difference effects, and group size effects. This group showed a clear interest in differences that might arise when the activity changed for various reasons.

HONG KONG CASE THEME: GROUP OBSERVATIONS

This group of college students made observations about their group. Some of these were in a positive aspect. Other observations in this category pointed out less ideal traits about the group. Together, these comments coded and collected under the theme, "Group Observations."

GROUP OBSERVATIONS SUB THEME: POSITIVE GROUP PROCESSES

The first sub-theme concerning group observations was associated with positive group processes. Some felt as though the group worked together well. Lang Hai shared, "We were in harmony." A way this was evidenced in Lang Hai's mind was that "We did not say foul language even though we got stuck in the process." To Lang Hai, a lack of foul language demonstrated group harmony.

Feng Jian also expressed how important it was “to help each other and to cooperate with each other.”

Xun Xiang shared that "The study helps me to realize that giving more opinions is significant." Some noticed harmony, but Xun Xiang shared newly recognized importance in the positive process of offering input.

Feng Jian also expresses a helpful element of group process. He recognizes different levels of perceived difficulty amidst his peers. He shared, "I am afraid that this task may not be really hard to some people but may be hard to some people. Since different members may have different perception on the task." This statement showed an integral part of group process, understanding that perceptions of the activity were going to be different between group members.

Gao Lexi expressed her attitude toward teammates like this: “Generally, it’s good.” A positive attitude toward one’s group is also a helpful process in group dynamics.

This group expressed some elements of positive group process that emerged into a theme. For some, the positive group process was harmony indicated by a lack of profanity. For others, it meant recognizing differing perceptions of the activity. Still, for others, it was having a generally good disposition toward group mates. All of these expressions amounted to a sub-theme about group observations that indicated positive group processes were taking place.

Group Observations Sub Theme: Negative Group Aspects

Some aspects of the group coded with negative modifiers about group process. Feng Jian shared that "It is hard to cooperate with the whole group and there is seldom teamwork."

Gao Lexi observed that "Some group members did not speak at all," associating this with uncertainty in her teammates.

Xun Xiang also noticed quietness in her group. Answering the same question about uncertainty, she writes, "Not everyone give opinion." Both Gao Lexi and Xun Xiang picked

up on a lack of input from teammates. Between Feng Jian, Gao Lexi, and Xun Xiang, it was evident some dynamics in the group were not ideal.

Overall, participants had more positive things than negative things to share about their group, but together these expressions contributed to a theme of group observations. These college students took note of their own group and shared their expressions about it.

Hong Kong Case Summary: Vignettes and Themes Comparison

Hong Kong Case Vignettes

Hong Kong Control Group-Case Half Vignette

This facilitator explained this activity with a small amount of demonstration. While the facilitator forgot to share the hints, the group discovered them on their own. The group worked together for a time on this activity and experience failures (Fig. 4.12 and 4.16). They sometimes discovered that they had entered into a failure scenario immediately, and other times played it out until they ran out of legal moves to see what would happen. After these failed attempts, the group then fractured into two groups. The fracture began when the entire group except for one walk to the chalkboard to develop a diagram of Traffic Jam. Slowly, up to three other participants joined the lady who remained on the squares to practice movement sequences. The other three participants continued at the chalkboard. Those who returned to the squares occasionally drifted back and forth between the two groups. Finally, a commotion happened at the chalkboard, and the entire room realized they are close to the solution. Two participants finished developing the solution while everyone waited, standing on the squares. Finally, those at the chalkboard depicted the solution. The group uses the diagram on the chalkboard to methodically apply it to their activity. They achieved success as a staff member and a student called out directions, but everyone else in the group attentively checked their decisions along the way. This group specifically expressed their pride in discovering the solution without hints.

Hong Kong Experimental Group-Case Half Vignette

This activity began with a facilitator explaining Traffic Jam using demonstrations. He explained the legal and illegal moves, but his explanation was cut short at the end by someone who felt as though they had fully understood Traffic Jam's rules. This particular individual dominated in leading the group, and most participants followed him complicitly. The other participants gave input and the leader received it. This leader's strategy used the other group members to play out a trial-and-error approach as he stood to the side to work out the solution. During this trial-and-error process, repeated failure occurred (Fig. 4.12 and 4.16). Resetting happened with a light-hearted mood and participants feeling motivated to "try again." Sometimes the group recognized that they had entered a failure scenario, and other times they played it out until they ran out of legal moves. While the facilitator offered the option for unanimous hints, not everyone in this group wanted them. Another participant began to draw a model on the chalkboard but decided against it, so did the dominating leader later in the activity. Eventually, the leader discovered the solution and leads the group to success while the rest of the team made sure he gave the correct directions.

Summary of Hong Kong Case Themes

This case had two primary themes: influencing variables to Traffic Jam and group observations. This group was curious about different factors that could change the Traffic Jam activity into a different experience. Possible factors of influence were differences introduced because of the hints, demographic differences, and group size differences. They also made positive and negative observational comments about aspects of the group. The observations considered both helpful and less ideal factors for group dynamics. Influencing variables and group observations emerged as the top themes for the Hong Kong case.

4.3.3 Case Comparison

Each case in the study is represented with themes and two narrative vignettes. This section compares and contrasts case themes and narrative vignettes. This process seeks to discover similarities and differences that might emerge across the three cases explored in the qualitative aspect of this mixed-methods study.

Thematic comparison across cases identifies overlapping themes and sub-themes. If one case demonstrates a theme that another case did not demonstrate, this research reviews the coded and themed dataset to confirm whether the theme is actually unique or whether there are minor, similar themes present in the other cases. This step guards against the error of assuming that a group has a unique theme and allows a robust thematic discussion.

4.3.3.1 Comparative Thematic Analysis

Three main meta-themes developed out of the comparative thematic analysis. This thematic comparison uses the terms "theme" and "sub-theme" to talk about themes or sub-themes which emerged in a specific case. These findings use "meta-theme" and "meta-sub-theme" to discuss overarching themes and sub-themes which emerged across the three cases. Meta-themes and meta-sub-themes are italicized where reported in this study. The first meta-theme collects codes around the group's discussion of an ideal group: *The Group Ideal*. The second overarching theme collected from codes pertaining to the activity itself, called *Understanding the Activity*. The third meta-theme, *Transference*, comes from codes about transferring knowledge from the Traffic Jam context to other areas of a participant's paradigm. Each meta-theme and meta-sub-theme discussed here considers what similarities the other cases had according to those themes. This research offers an initial chart of thematic overlap (Table 4.32) at the beginning of these thematic comparison findings and a refined chart (Table 4.33) at the end with the summary.

Table 4.32 – Initial Thematic Analysis Comparison Chart with Resulting Meta-Themes and Meta-Sub-Themes

Initial Thematic Analysis Comparison Chart with Resulting Meta-Themes and Meta-Sub-Themes				
Meta-Theme	Meta-Sub-Theme	Case		
		UK Themes and Sub-Themes	USA Themes and Sub-Themes	HK Themes and Sub-Themes
The Group Ideal	*Role Stratification*	Organizational Leader Influence	Status in Group	
	Roles of Leadership	**Leadership Expectations/** Who Should Lead? Not me. /Leader Character Descriptions		
	Communication	**Communication** / Quietness/ Listening/ Too Much Talking		
	Group Observations		**Reflecting on the Group/** Group Qualities/ Longstanding Relationships	**Group Observations/** Positive Aspects / Negative Aspects
	Teammate Observations	Teammate Descriptions		
Understanding the Activity			**Reflecting on the Activity/** Hindrances/ Solution Approaches/ Observations about Traffic Jam Itself	Influencing Variables to Traffic Jam/ Influence from Hints/Group Size
		Repetitive Failure		
Transference		Transference Output		Demographic Influences
Note: Meta-themes and meta-sub-themes appear in italics, case themes appear in bold, and case sub-themes appear in standard font.				

META-THEME: *THE GROUP IDEAL*

The first meta-theme that emerged from this comparative case study identified participant's thoughts about their group. Participants made so many comments about the nature of their group, what they expected from a good group, and what should not happen in a group. Codes included dimensions connected to roles, leadership, communication, observations about the group itself, and observations about teammates. This section reviews where individual case themes overlap. This comparison section also resifts the data to explore whether initial themes from individual cases were confirmed through codes in other cases. If codes were not shared in initial findings but discovered in the review of codes, they were added at this step.

THE GROUP IDEAL META-SUB-THEME: *ROLE STRATIFICATION*

Role Stratification came up most prevalently in the U.S.A. case study because the group discussed different levels of status. They mentioned being new or experienced, with Liam suggesting a more intermediate option as well. The U.K. case loaded a theme related to organizational leadership. That theme showed evidence of roles within the U.K. case as well. Thomas shared a point that showed further evidence of role stratification. He wrote, "In a university setting, I'm generally the one who leads. But in a church setting where there are many older and wiser people there, I'm not so much of a leader." Thomas' recognition of having a different hierarchical role outside of church and inside church shows more support for the notion of stratified roles within the U.K. case as well.

Role Stratification was not uncovered as a dynamic in the HK case as a result of this exploratory research. Linguistic differences could have caused this finding. This finding could also be attributed to the possibility that strata were simply not a part of the discussion in the H.K. case. While the researcher uncovered role themes in the U.K. and U.S.A. cases,

this theme did not present in the H.K. case. With these possibilities in mind, the lack of findings about role stratification within the H.K. case shows a limitation of this study.

The Group Ideal Meta-Sub-Theme: *Leadership*

Another meta-sub-theme of the Ideal Group theme came from a theme about leadership. The U.K. case's discussion focuses heavily on leadership for two reasons. First, the group was comprised of leaders. Second, the premise of their meeting was to improve their leadership skills. The activity itself front-loaded on the leadership development topic, so naturally, this theme would emerge. The U.S.A. and H.K. cases did not meet intending to develop leadership skills, but this research identified leadership codes from both cases.

In the U.S.A. case, *Leadership* was a minor theme under this case's reflection about their group. That minor theme went unreported in original findings, so it is reported here in the cross-case review. Many of the codes in this case related to a newer member, Mia. Mia vied for leadership in the activity. Participants noticed a mismatch between her ability and the ability required to lead the task. Another participant, Alexander, connected spatial reasoning skills demonstrated by Liam and the spatial reasoning skills required to lead the activity. That connection coded under leadership. Leadership codes in the U.S.A. case connected a match between skillset and the challenge of the activity. While comments about Abigail and Sophia's experience coded in accordance with role stratification, in retrospect the comments Liam made were also about their leadership. Liam called them "the older, more experienced leader types," observing who the leaders were in his group. These coded quotes show enough data to support the meta-sub-theme of leadership raised by the U.K. case.

In the H.K. case, at least one person brought up the topic of leadership. Lang Hai suggested that in "all the games… you can find the one leader to lead." Lang Hai not only shared this coded quote, he also demonstrated it as the strong, solitary leader of his group. Lang Hai was the only participant to mention the idea of leadership. His mention of

leadership showed that the H.K. study might support the meta-sub-theme of *leadership* if more investigation happened. This comparative case study will consider Lang Hai's code, but does not consider it enough to show any thematic support of leadership from the H.K. case.

In summary, the U.K. and U.S.A. cases support the leadership meta-sub-theme. The H.K. case presents one code about leadership. Further research would be required to demonstrate leadership as a solid theme on participants' minds in a case in H.K. One code in the H.K. case allowed for the possibility that the leadership meta-sub-theme could emerge in a future H.K. case study.

THE GROUP IDEAL META-SUB-THEME: *COMMUNICATION*

Communication was the next meta-sub-theme that emerged from the U.K. case. The UK case's discussion about communication focused on aspects like quietness, listening, and too much talking. While the U.K. case presented communication as a major theme, communication also emerged in the U.S.A. case. In the U.S.A. case, the communication theme went unreported in the original findings because it emerged as a minor sub-theme of group qualities. Upon further investigation, it actually represented most codes under the group qualities theme. This group of codes shows support of the communication meta-sub-theme.

Hong Kong case codes connected to *Communication* as well. In the H.K. case findings, Xun Xiang found the newly-discovered importance of offering input. This coded under communication. Lang Hai's comment about the lack of foul language coded at communication as well. Two participants gave an affirmative answer when asked if they felt able to share. While these positive aspects of communication emerged in the H.K. case codes, there were negative codes about communication as well. The primary negative *Communication* code came from participants who observed others' not speaking and offering input. Upon factoring in these positive and negative *Communication* codes, the H.K. case

strongly supports the meta-sub-theme of *Communication*. As a result, these case comparison findings report the H.K. theme "group observations" and the sub-themes "positive aspects" and "negative aspects" in support of the *Communication* meta-sub-theme.

THE GROUP IDEAL META-SUB-THEME: *GROUP OBSERVATIONS*

It may be self-evident that a meta-sub-theme of *Group Observations* supports a meta-theme of *The Group Ideal*. The *Group Observations* meta-sub-theme represents the observational characteristics of many of the codes in this study. The U.S.A. case coded many observational comments about the group. An emergent sub-theme of those comments centred on the team's longstanding history. This theme also included expectations that participants had of other group members or observations about the group's connection. This theme was apparent in the H.K. case as well since they observed themselves working together harmoniously and feeling the importance of cooperation. They noted differing levels of perceived difficulty within their group as well. Both the U.S.A. and H.K. cases had codes to support the meta-sub-theme about group observations.

The U.K. case certainly included numerous codes of participants sharing their thoughts about the group, as is demonstrated in their specific findings. An example was when Chloe said, "It was like most of us were quiet."

Another example happened when Oliver wrote, "Some members seemed not to take information on board." These were but a fraction of the multiple codes corresponding to the U.K. case participants' comments about the group.

Perhaps *Group Observations* was not a major theme for the U.K. case due to the researcher. The researcher instead coded items like this as "Teammate Observations" for the U.K. case study. For the refined thematic analysis, "Teammate Observations" is now considered in support of the meta-sub-theme of *Group Observations*. This coding difference

illustrates the importance of a comparative case study. This difference shows how case comparison can correct errors that could arise when only exploring a single case.

META-THEME: *UNDERSTANDING THE ACTIVITY*

The next meta-theme is *Understanding the Activity*. Participants in all three cases worked to understand the activity so they could solve it. In the initial comparative thematic analysis, the meta-theme *Understanding the Activity* was suggested. However, the initial meta-theme included no meta-sub-themes. Difficulty in dividing the meta-theme *Understanding the Activity* into meta-sub-themes probably rests in the processual nature of this meta-theme. The two possible meta-sub-themes that eventually arose given the themes and sub-themes of cases were *Understanding the Problem* and *Solution Strategies*. These are not mutually exclusive categories. In this effort to divide this meta-theme, it grew apparent that the activity understanding process included messy codes not easily divided. The case themes which support this meta-theme render into somewhat overlapping meta-sub-theme categories because they represent a process.

UNDERSTANDING THE ACTIVITY META-SUB-THEME: *UNDERSTANDING THE PROBLEM*

The process of understanding the activity includes understanding the problems inherent in the Traffic Jam activity itself. The U.S.A. case made comments about the activity itself, indicating a beginning process of understanding Traffic Jam. Codes represented surprise at the difficulty level, realizations that resets would be required, issues caused by physical positioning, and feeling that the path to the solution was clear. In consideration of these U.S.A. themes, the U.K. case offered commentary about the activity under a different theme. The U.K. themed similar codes under "inhibited progress." This theme included statements like "She stepped out of the line to get a bit of a vantage view of everyone," which was shared by Henry about Erin. Another person expressed that a part of the activity made

them feel physically stuck. Ava wrote, "We couldn't move!" Understanding Traffic Jam's nature was part of *Understanding the Problem*.

Another major element of *Understanding the Problem* in Traffic Jam was understanding the repetitive failure component. Many participant responses from the U.K. coded and themed under repetitive failure. U.S.A. case responses about repetitive failure coded under the "hindrances" theme. Codes in the "hindrances" theme are similar to codes in the U.K.'s "Repetitive Failure" theme. Participants indicated that repetitious failure led to reflection, motivation, and, ultimately the solution. In the H.K. case, at least two participants indicated the importance of retrying something. Some H.K. participants considered the importance of repetitious failure, but they called it "trying again." The H.K. codes imply that Traffic Jam includes failed attempts and trying again. All three cases indicated that Traffic Jam involved a repeated failure in the process of discovering the solution, but many codes elaborated that repetitious failure produced reflection or motivation for a subsequent attempt

UNDERSTANDING THE ACTIVITY META-SUB-THEME: *SOLUTION STRATEGIES*

The next meta-sub-theme of *Understanding the Activity* is *Solution Strategies*. Participants in the USA group shared their reflections about the path to discovering Traffic Jam's solution. They shared that building a model, dividing into smaller teams, and trying again were all elements to discovering the solution. They all looked for ways to make Traffic Jam easier to solve. While not presented in the initial findings for the U.K., many participants mentioned elements that lead to success. Harry shared, "We focused, and then suddenly we just got it done," indicating Harry's observed connection between focus and success.

Henry shared, “We got back to the beginning and actually that’s the catalyst for actually getting us success at the end.”

Oliver wrote, “People had to communicate well and work together to complete the task.”

These codes show that there were, indeed, participants who thought critically about strategies to discover the solution in the U.K. case.

In the H.K. case, Xun Xiang shared, "I think it depends on whether we know each other or not." She raises an issue that might impact the group's progress on Traffic Jam.

Lang Hai recommended a single person leadership model as the path to discovering the solution to Traffic Jam.

Yan Mu said, "I chose to do it on my own," indicating his path to discovering the solution. He uses this approach because of differing skill levels and lack of teamwork in the group.

These three codes show that participants in the H.K. study had ideas about the best way to solve Traffic Jam too. They, along with the U.K. and U.S.A. case, support the meta-sub-theme *Solution Strategies* as a part of the meta-themed process, "Understanding the Activity."

META-THEME: *TRANSFERENCE*

The final theme was *Transference*. Participants in the U.K. case made transferrable reflections about themselves, future groups, and even the Traffic Jam activity. The term transference implies reflections which a participant applied from Traffic Jam to future and hypothetical situations. Participants considered how they might change their leadership style, treatment of others, and delivery of humour in the future. This *Transference* reflection happened in the H.K. case as well, but a surprising theme emerged from the H.K. case. These participants wondered what changing different variables would do to Traffic Jam. They wondered if changing group size might affect the difficulty. They also thought about how a group of extremely wealthy people would complete Traffic Jam. Another person inquired about differences cultural background might introduce to Traffic Jam. Curiously, they

thought to transfer the activity itself, but it is possible their questions connected with deeper meanings for participants.

While not reported in the original findings, returning to the data for this comparison showed a minor theme in the U.S.A. cased called "After Activity." Participants in the U.S.A. case also transferred learned concepts from Traffic Jam to other areas. They learned things about their teammates and considered how they might act in future interactions. Mia wrote, "I figured out that some of us are visual learners."

Logan observed, "Mia steps up to take leadership and control of how to move forward," learning something about her as a new team member.

Jackson wrote, “I probably should jump in sooner with the solution.”

Several codes supported the addition of the U.S.A. case's theme, "After Activity," into the meta-theme of *Transference*. All cases aligned on this code due to the design of the research, which intentionally probed for transferable reflection.

Comparative Thematic Analysis Summary

This comparative thematic analysis uncovered three meta-themes. The first meta-theme, *The Group Ideal*, reflects case themes where participants described their group and how they wanted it to become. Meta-sub-themes of *The Group Ideal* included codes about *Role Stratification, Leadership, Communication*, and general *Group Observations*. This comparative case study uncovered a second meta-theme called *Understanding the Activity*. *Understanding the Activity* comes from the two meta-sub-themes *Understanding the Problem* and *Solution Strategies*. Both groups went through a process of understanding Traffic Jam and the difficulties involved in the activity. Then they sought a path to the solution. Finally, the meta-theme *Transference* developed because of reflective, connective thoughts that participants had between Traffic Jam and other aspects of life following the activity. Table

4.33 represents the refined version of the initial chart, including the discoveries produced by revisiting the data in this case comparison.

Table 4.33 - Refined Thematic Analysis

Refined Thematic Analysis Comparison Chart				
Meta-Theme	Meta-Sub-Theme	Case		
		UK Themes and Sub-Themes	USA Themes and Sub-Themes	HK Themes and Sub-Themes
The Group Ideal	*Role Stratification*	Organizational Leader Influence	Status in Group	x
	Leadership	**Leadership Expectations/** Who Should Lead? Not me./Leader Character Descriptions	+	-
	Communication	**Communication** / Quietness/ Listening/ Too Much Talking	Group Qualities (Communication Aspects)	**Group Observations/** Positive Aspects / Negative Aspects
	Group Observations	Teammate Descriptions	**Reflecting on the Group/** Longstanding Relationships	
Understanding the Activity	*Understanding the Problem*	Inhibited Progress (+)/ Repetitive Failure,	Hindrances/ Observations about Traffic Jam Itself	Trying Again (+)
	Solution Strategies	Solution (+)	Reflecting on the Activity/ Solution Approaches/	+
Transference		Transference Output	After Activity	**Influencing Variables to Traffic Jam/** Influence from Hints/Group Size/ Demographic Influences

Note A: Meta-themes and meta-sub-themes appear in italics, case themes appear in bold, and case sub-themes appear in standard font.
Note B: Top-level themes indicate in bold and sub-themes in non-bold. Themes in italics were added during data revisitation in case comparison. (+) indicates differently-themed or non-themed codes discovered through data revisitation, which demonstrate adequate support a sub-meta-theme. (-) indicates weak evidence of codes supporting this sub-meta-theme. (x) indicates no supporting data for this sub-meta-theme.

4.3.3.2 Observation Narrative Comparison

This research compares narrative data from case vignettes using a chart that highlights common narrative elements. Instead of three blended case narratives, this narrative comparison displays six case-halves side-by-side. This decision allows for insight into similarities across and within cases as well as across individual case-halves. This section of the comparative findings produces "common narrative elements" that describe elements of commonality that emerge when comparing the observation narratives. Common narratives appear in italics for clarity.

Common Narrative Element: *Facilitator Explanation*

In the narrative analysis, narrative elements emerged through observations in case halves. The first element which arose was the facilitator's method of explanation. Every case half, save for the U.K. experimental case half, employed explanation and demonstration of some sort. Of note, the UK experimental facilitator gave a detailed explanation of Traffic Jam that participants seemed to understand when they approached the squares. Of other interest, the U.S.A. control facilitator explained his activity in a mock voice mimicking a teacher speaking to three-year-old children. When facilitators used demonstration, not every participant demonstrated the rules. Usually, facilitators would have one or two participants demonstrate and sometimes demonstrated the rules themselves.

Common Narrative Element: *Unique Group Elements*

This research observed some unique group elements caused by specific participants in case halves. The U.K. control case half had one participant who joked a lot. The group was also comprised mostly of males. Another group with a unique trait was the U.S.A. control group. They valued their longstanding connections despite having a new team member. This case half demonstrated multiple occasions of forgotten names. Also, in this case, one member expressed distress after being physically handled and insulted. The U.S.A. experimental

group was uniquely smooth and methodical, which could not be attributed to one specific participant because participants all invested. Finally, the H.K. experimental group included a participant who interrupted the end of the facilitator's explanation. This list does not mention every case half because some of the unique factors from other cases categorize into other groups.

COMMON NARRATIVE ELEMENT: *COMPETITION BETWEEN CASE HALVES*

The U.S.A. control and experimental case halves introduced an element of competition into their groups. Either group did not heavily consider the competition element, but it was mentioned once in each group. In the experimental case half, the facilitator mentioned competition at the outset of the activity. In the control case half, participants mentioned competition very late in the activity. Perhaps this case had a competitive nature throughout.

COMMON NARRATIVE ELEMENT: *COMMUNICATION ASPECTS*

Noteworthy aspects of communication happened in four case halves. In the U.K. experimental case half, the group begins by speaking very little initially. Their conversation ramps up significantly on the second attempt. In the control case half for the U.K., the group is very conversational from the beginning and hits a point where participants feel there is too much talking. Another communication element happened in the U.S.A. experimental case half. The most experienced participants in the group stood on the far ends of their Traffic Jam. This introduced a difficulty for the group due to positioning. Additionally, the organizational leader of the case worked in this group. She chose to withhold her input to allow other participants the opportunity to input more. While communication elements happened in all groups, some elements about communication related better to other narrative elements. Finally, a limitation of this study happens with the H.K. cases. Because of the language difference, even with gatekeeper communication, discovering conversational

nuances was out of reach for this research effort. The narrative elements shared here pertain specifically to communication aspects which stood out in case halves.

COMMON NARRATIVE ELEMENT: *HINTS*

The research designed the same hints for every group. Experimental case halves received the hints only upon unanimous request. All experimental case halves rejected the hints when offered them. For the control half of the U.K. experiment, the facilitator shared at least one hint. This group had two members who had participated in Traffic Jam previously. The researcher asked these experienced participants to remain silent for the majority of the activity as a control against experience bias. The research introduced this control more for the quantitative aspect of the experiment. After some time, one of those experienced participants began to offer some input. At that point, the researcher allowed both experienced participants to share. The other experienced participant offered their help, but the group chooses not to receive their advice. In contrast, the control group facilitator in the U.S.A. case offered at least two hints, but he said them so cryptically that they confused the group more than anything. Finally, the H.K. control facilitator forgot to give the hints, but upon reflection, he suggested that the group did not need the hints anyway. His assertion is correct because the participants naturally discovered each hint on their own. Participants generally rejected hints when offered to the experimental case halves with stipulations of there having to be unanimity. With the control case halves, the dynamics were different because of specific conditions within the group.

COMMON NARRATIVE ELEMENTS: *TYPES OF FAILURE EXPERIENCED* AND *FAILURE RECOGNITION PROCESS*

All groups experienced Figure 4.12 and 4.16 failures. No group avoided either of these options. All groups visited these scenarios multiple times. In Table 4.34, the row following the *Types of Failure Experienced* row is called *Failure Recognition Process.* The

Failure Recognition Process common narrative element illuminates an aspect of the failure scenario: when the case half recognized their entry into a failure scenario. After a group entered a Figure 4.12 or 4.16 failure scenario, legal moves remained available. Remaining legal moves meant a group could continue in the activity without realizing they had already failed. All groups entered a failure scenario and continued forward without realizing they failed at some point. Some groups did this more than others, but every group demonstrated this behaviour. Every group entered into Figure 4.12 and 4.16 failure and continued in it without realizing it.

COMMON NARRATIVE ELEMENT: *VIEW OF RESETS*

Participants from same case halves shared about resetting. In the U.K. control case half, participants at first felt they reset without learning anything, but then reflection occurred in a reset to help them discover the solution. The U.K. experimental case half shared their views of resetting: resets led to momentum, motivation, and learning. The control half from the U.S.A. case did not realize they were allowed to reset for part of the activity. Eventually, they decided resets were allowed. They also did not see resets as motivating. The U.S.A. experimental case half did view resetting as motivating. The H.K. control case half's view on resetting was not collected through any of the observation methods in this study. The experimental case half handled resets in a light-hearted manner, and their attitude was to keep trying. The views of resets were spread, with a majority of case-halves expressing that resetting eventually became motivating. However, this finding should be taken with caution as these views were supported by some participants and not agreed on by the entire set of participants in each case.

COMMON NARRATIVE ELEMENT: *LEADERSHIP DYNAMICS*

Leadership Dynamics varied across case halves. In the U.K. control case half, there was a slow shift in leadership from a male who was in the middle of the Traffic Jam to a

female leader at the very end of the line. This female leader stepped to the side of the line early in Traffic Jam, which allowed her to gain a better perspective of the activity. The U.K. experimental case half had a somewhat similar dynamic between a strong communicating organizational leader and a soft-spoken participant who discovered the solution. Participants in this group expressed that they should have selected the soft-spoken participant as their leader. Participants in the U.S.A. control case half thought Traffic Jam was impossible, which resulted in the group fracturing into three smaller teams. This fracture was seen as a strength because participants used different approaches to solve the problem: the first smaller group drew a diagram of the activity on paper, the second continued standing on the squares discussing Traffic Jam, and the third used a chessboard to solve the problem. The experimental case half in the U.S.A. case had a highly engaged and participatory group. There were two stronger direction-givers, but everyone was pretty involved. The control case half in H.K. fractured into two groups: one that drew a diagram on a chalkboard, and another stood on the squares to try scenarios. Some participants drifted between these two groups. Finally, the experimental case half in HK had a single, dominating leader who used trial and error with his participants to discover the solution. Across all six case halves, the leadership style and process developed differently, but each group selected a leadership style to suit their needs.

COMMON NARRATIVE ELEMENT: *SOLUTION DISCOVERY PROCESS*

Each case half discovered the solution to Traffic Jam in a variety of ways as well. Participants often ignored or passed-over the solution when someone first suggested it. In the experimental case half for the U.K. case, a quieter member shared the solution with a strong communicator. Unfortunately, the strong communicator was not able to direct the group to achieve the solution. The quieter member shared the solution again later and the group then executed success. In the U.S.A. control group, a participant shares the solution twice, but the

group did not hear him either time because they were focused elsewhere. Finally, the participant who produced the solution used a chessboard to show the group. They took notice and achieved the solution. The solution in the U.S.A. experimental group was discovered before the rest of the group adopted it. Others in the group needed to understand it for themselves before they could apply it. The solution was discovered in the H.K. control group by drawing a long, detailed diagram on the chalkboard. The solution in the HK experimental group was discovered by a dominating leader who used the group for trial-and-error. An exception happened in the U.K. control case half. The first time someone said the key to solving Traffic Jam, they shared it with a leader who listened. That leader leads the group to the solution after a few attempts. With only one exception, a participant would express the solution in the group before the group adopted it and used it to solve the Traffic Jam.

Common Narrative Element: *Success Attempt Description*

The actual success attempt looked very similar across case halves. Generally, once a group discovered the solution to Traffic Jam, some form of leadership called out directions, while most others in the group made sure the leader gave accurate directions. In this execution process, not everyone was fully aware of the solution, but the majority of participants who had gained enough understanding of the solution sequence double-checked the leader. It appeared that a critical mass of understanding was required within a group for them to play out the solution to Traffic Jam.

Observational Narrative Comparison Summary

The narrative comparison across cases and case halves discovered some strong commonalities and differences across the observed experiences of each activity iteration. The facilitation style from each case half mostly included explanation and demonstration with one exception. Participants often rejected hints and other help. Every group entered Figure 4.12 and 4.16 failure scenarios and passed through them, not realizing they had failed. The

leadership style and method of discovering the solution varied across case halves; however, each case half required a strong portion of the team to understand the solution for the successful attempt at the end. The final, successful attempt involved a leader giving directions while other participants checked their directions step-by-step. These generalizations about the groups pass over specific traits for each group, but they are presented here in the findings for further analysis in the next chapter. Table 4.34 succinctly depicts the findings of this observed narrative comparison.

Table 4.34 - Common Narrative Elements across Cases and Case-Halves

Common Narrative Elements across Cases and Case Halves						
Common Narrative Element	U.K. Case		U.S.A. Case		H.K. Case	
	U.K. Control Group	U.K. Experimental	U.S.A. Control	U.S.A. Experimental	H.K. Control	H.K. Experimental
Facilitator Explanation Style	Facilitator explained with demonstration	Facilitator explained, no demonstration	Facilitator explained as if to three-year-olds with demonstration	Facilitator explained with demonstration	Facilitator Explained with demonstration	Facilitator explained with demonstration
Unique Group Element(s)	- One participant jokes a lot. - Mostly male group.		- Group values their longstanding connections despite new team member. - Multiple names forgotten. - One participant was grabbed and insulted	Smooth, methodical feel to the group due to participant investment.		Participant interrupts facilitator explanation early.
Competition between Case-Halves			Participants suggest competitive element against other case half	Facilitator suggests competitive element against other case half		

Common Narrative Elements across Cases and Case Halves						
Communication Aspects	High group interaction from the begging that becomes too much talking.	Group barely speaks on first attempt, second attempt includes more discussion.		More experienced participants on far left and right ends had difficulty because of positioning. One withheld their input as organizational leader.		
Hints	- Rejected help from two experienced participants. - Facilitator offered at least one hint. - Another hint discovered by leader.	Unanimous hints offered: not everyone wanted them.	Cryptic, unclear hints offered.	Unanimous hints offered, not everyone wanted them.	While the facilitator forgot to share the hints, the group discovered them on their own.	Unanimous hints offered, not everyone wanted them.
Types of Failure Experienced	Fig. 12 and 16 failure.	Fig. 12 and 16 failure	Fig. 12 and 16 failure	Fig. 12 and 16 failure	Fig. 12 and 16 failure	Fig. 12 and 16 failure
Failure Recognition Process	Failure scenario entered, participants continued without realizing.	Failure scenario entered, participants continued without realizing.	Failure scenario entered, participants continued without realizing.	Failure scenario entered, participants continued without realizing.	Failure scenario entered, participants continued without realizing.	Failure scenario entered, participants continued without realizing.
View of Resets	At first, reset without learning. Then reflection happened in reset.	Resets were frustrating, but offered momentum, motivation, and learning.	Initially did not realize resetting was permitted. Resets not motivating.	Viewed resetting as motivating.		Light-hearted, keep trying attitude toward resetting.

Common Narrative Elements across Cases and Case Halves						
Leadership Dynamics	- Shift in leadership from male participant in the middle to female participant on the end who steps out for perspective. - Leadership shift occurs after a fracture because of repeated failure.	Strong communicator and organizational leader takes charge while a soft-spoken member generates the solution. Other participants feel they misplaced leadership responsibilities on the organizational leader.	- Some think Traffic Jam impossible. - Group fractures into three: One draws model on paper, one uses chessboard, one stands on squares.	Everyone participated in discovering solutions with two primary direction givers.	Group fractured into two groups: one drew a diagram and one stood on squares. Some members drift between two fractures.	Single dominating leader, half-hearted attempts at drawing model were made
Solution Discovery Process	One participant discovers the answer and shares it with the female leader, giving a vote of confidence in her with the solution.	Some felt they had no idea how to solve the activity while one quiet person was able to discover the solution and share it with the strong communicator.	One participant shares the answer twice and very early. Group talks over him, so they miss it. Group realizes they have the answer when the participant demonstrates it on a chessboard.	One participant discovered the solution early, but the group did not immediately adopt the advice. Others had to understand it for themselves before the solution could be applied.	Solution discovered by drawing a model diagram	Solution discovered through single leader's trial and error
Success Attempt Description	Success attempt involved female leader giving directions and all group members checked her direction.	Success attempt involved quieter participant giving directions and strong communicator taking over after two directions given. Group members checked his directions for accuracy.	Success attempt involved participant who discovered the solution through the chessboard. He directs the group while the group checks his directions.	Success attempt included two stronger leaders, but everyone checked their directions.	Success attempt includes direction from two people while most of the group checks the solution.	Success attempt includes directions from dominant leader, but other participants check his decision.

4.3.4 Qualitative Findings Summary

The final summary of these qualitative findings explores the narrative elements and themes together. There are many ways of doing this process (Creswell, 2014), and this research selects iterative tables to produce a comparative report of the findings. At this point in the research effort, a large amount of narrative data supports the common narrative elements presented in the table. Likewise, the meta-themes and meta-sub-themes rendered in the table are backed by many case themes and codes. As a result of the robust supporting evidence for meta themes and common narrative elements, it seemed inappropriate to disconfirm any findings at the end of the study. Instead, this summary intends to make sense of meta-themes and common narrative elements together in the final summary of qualitative findings.

For the first step toward a final comparison, the research tried to fit the common narrative elements into the meta-theme categories (Table 4.35). This choice made sense as a starting point, and it worked to some extent. However, narrative data did not fit cleanly into meta-sub-thematic categories. For example, the common narrative element, *View of Resets*, covered both meta-sub-themes of *Understanding the Problem* and *Solution Strategies*. Some sub-meta-thematic categories accounted for multiple common narrative elements, such as *Understanding the Problem*. These messy categories could be accepted, but this categorization method forced common narrative elements into thematic categories. In doing so, could possible categories that emerged from common narrative elements go amiss?

Table 4.35 – First Iteration Table Merging

Common Narrative Elements, Meta-Themes, and Meta-Sub-Themes

First Iteration Table Merging Common Narrative Elements with Meta-Themes and Meta-Sub-Themes			
Meta-Theme	Meta-Sub-Theme	Common Narrative Element	
The Group Ideal	*Leadership*	*Leadership Dynamics*	
	Role Stratification		
	Group Observations	*Unique Group Element(s)*	*Competition between Case Halves*
	Communication	*Communication Aspects*	
Understanding the Activity	*Understanding the Problem*	*Facilitator Explanation*	*Hints*
		Types of Failure Experienced	*Failure Recognition Process*
			View of Resets
	Solution Strategies	*Solution Discovery Process*	
		Success Attempt Description	
Transference			

So, this iterative comparative process attempted the opposite strategy: the research tried to fit meta-themes and meta-sub-themes under the common narrative elements. However, the common narrative elements did not make sense as categories themselves. It appeared they made more sense as a process, but the process did not appear linear. So, naming each common narrative theme step one, step two, and so on would not work either.

Next, this research attempted to name an overarching process above each common narrative element (Table 4.36). Preserving the presented order of the common narrative

elements appeared crucial in this process. After all, these common narratives came from narratives written like stories: stories with beginnings, middles, and ends. Next, the researcher assigned process descriptions to each common narrative element. This step allowed higher narrative process categories to emerge. From that step, the researcher saw that each narrative contained two overarching process elements.

Table 4.36 - Common Narrative Elements and Overarching Processes

Common Narrative Elements and Overarching Processes	
Common Narrative Element	Overarching Process
Facilitator Explanation Style	*Orientation*
Unique Group Elements	
Competition Between Case Halves	
Communication Aspects	
Hints	
Types of Failure Experienced	
Failure Recognition Process	
View of Resets	
Leadership Dynamics	*Application*
Solution Discovery Process	
Success Attempt Description	

Orientation is the first overarching process occurring across these common narrative elements. Some of the common narrative elements showed the group orienting themselves to the nature of the activity, and others showed the group orienting themselves to the nature of their group in the activity. These findings employ the word orient to convey learning or understanding processes that took place within the activity story. The group gains their

bearings within the context: the activity and the people with whom they hope to accomplish the activity.

However, three common narrative elements at the end of the list did not fit into either of these categories. *Leadership Dynamics, Solution Discovery Process*, and *Success Attempt Description* all describe the process of how the group applied their understanding of Traffic Jam and their teammates in the Traffic Jam context. There is a processual shift in these narratives from orientation to application. The group must apply all that they have learned during the process to finish the activity. The broad, overarching narrative process described by common narrative elements describes group orientation followed by application.

So, the final comparison presented in these qualitative findings suggests higher-level comparisons from both narrative and thematic approaches. The orientation process emerging from the common narrative elements aligns with meta-themes *The Group Ideal* and *Understanding the Activity*. The group learning about themselves and the activity are essentially the two aspects of the orientation process.

In this comparative process, mismatches developed between overarching processes from common narrative elements and meta-themes. These mismatches occurred at the overarching narrative process of application and the meta-theme transference. Observations occurred in real-time thanks to video recording, so cameras captured a moment of application in each narrative that an after-activity debrief could not measure. Inversely, the thematic analysis captured something that the observational narratives missed: *Transference*. Participants were not thinking about future applications as a result of Traffic Jam while they continued to solve it. These two methods captured overarching components uniquely through each method: an *Application* overarching narrative process through observation and *Transference* thinking through thematic analysis. Table 4.37 shows the final products of the two methods.

In summary, the qualitative aspect of this mixed-methods exploratory research endeavour discovered five general functions that took place within a group performing the Traffic Jam activity. Participants experienced a process of orientation to the group they were working (*The Group Ideal*) within the context of the Traffic Jam activity (*Understanding the Activity*). In the activity itself, this led to a moment of *Application*. Following the activity, participants experienced *Transference* thinking, connecting their experience in Traffic Jam to other hypothetical situations in the future.

Table 4.37 - Final Comparison of Overarching Narrative Processes, Meta-Theme, and Meta-Sub-Themes

Overarching Narrative Processes and Meta-Theme Comparisons			
Common Narrative Element	Overarching Narrative Process	Meta-Theme	Meta-Sub-Theme
Facilitator Explanation	*Orientation*	*The Group Ideal*	*Leadership*
Unique Group Elements			*Role Stratification*
Competition Between Case Halves			*Group Observations*
Communication Aspects			*Communication*
Hints		*Understanding the Activity*	*Understanding the Problem*
Types of Failure Experienced			
Failure recognized Process			*Solution Strategies*
View of Resets			
Leadership Dynamics	*Application*		
Solution Discovery Process			
Success Attempt Description			
		Transference	

4.4 Summary of Findings

The findings chapter presents a final product from both the quantitative and qualitative halves of this research. The quantitative findings produced a causal structural equation model using factor analysis that indicated a cyclic process of group development, personal investment, and engrossment influenced participant relational learning through engrossment. This process was externally influenced by a group's size and unanimity. The qualitative comparative case study method observed two overarching processes occurring within the case-halves: an orientation process followed by a moment of application. Alongside that finding, a thematic analysis showed that groups focused their comments on describing an ideal group and working to understand the Traffic Jam activity during this orientation process. After the activity, participants thought about how they might take lessons learned in Traffic Jam and apply transfer them to other areas of their lives. The following chapter will explore these findings in detail.

5.Chapter 5 – Analysis

5.1. Analysis Introduction

This final chapter first positions the findings in the causal structural equation model, overarching narrative processes, and meta themes within relevant academic literature. Next, this chapter synthesized the causal SEM, overarching narrative processes, and meta themes together using mixed-methods meta-inference. At the end of this chapter, a new model of Liminoid Group Learning is produced that demonstrates how Group Flow, Liminoid Theory, Group Problem Solving, and Co-Constructed Developmental Teaching Theory all co-occurred for participants during the Traffic Jam activity. Following this summation of the results, this chapter offers implications for facilitators and suggests areas of future research.

5.2 Quantitative Analysis

The quantitative findings in this study explored the experiences of 137 participants who participated in the Traffic Jam activity, an activity designed using the Modulated Liminoid Group Learning Synthesis (MLGLS). This research applied exploratory factor analysis (EFA) and confirmatory factor analysis (CFA) methods to explore the data derived from a 36-item questionnaire. The results of these factor analyses include 14 indicator variables loaded across four latent factors as well as a structural equation model (SEM) to represent the CFA findings. Next, this research explored causal relationships between those four latent factors as well as three, independent, exogenous variables. Statistical relationships between those seven variables were explored using an iterative model-building process that resulted in a causal SEM. This quantitative analysis section discusses the exogenous and endogenous variables of the causal SEM within the context of relevant literature. This quantitative analysis section includes a discussion comparing the original, hypothesized MLGLS and the final, causal SEM, followed by discussion of the measured experiences of

participants who participated in the MLGLS activity, Traffic Jam, and places those discussions within current literature.

5.2.1 Comparison of the Literature Review Hypothesis and the Confirmatory Factor Analysis Hypothesis

The literature review for this study produced a visually-modelled synthesis of four theories (Fig. 5.1). The four theories synthesized into the visual model were Liminoid, Flow, Group Developmental Stages Theory (GDST), and Co-Constructed Developmental Teaching Theory (CDTT). Together, the literature review synthesized those four theories into an

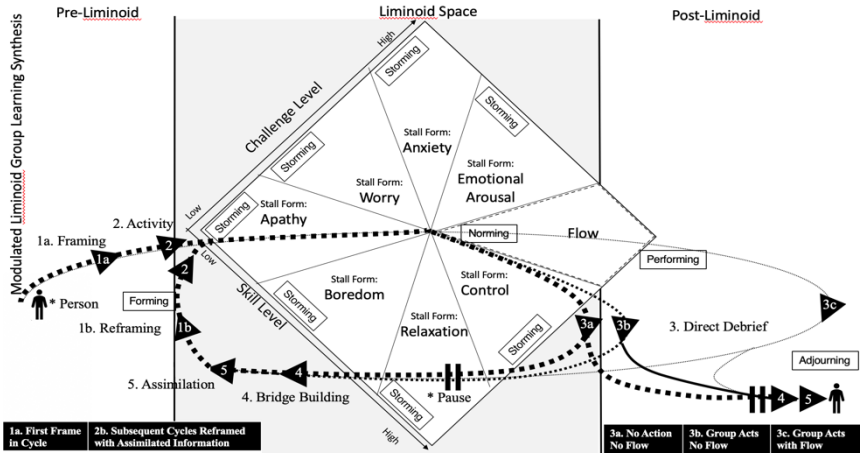


Figure 5.1 - Modulated Liminoid Group Learning Synthesis

overarching theory called the Modulated Liminoid Group Learning synthesis (MLGLS). MLGLS developed by weaving together four theories along lines suggested by relevant experts. This research then built another model to outline those hypothesized connections that more closely resembled a causal SEM path diagram (Fig. 5.2).

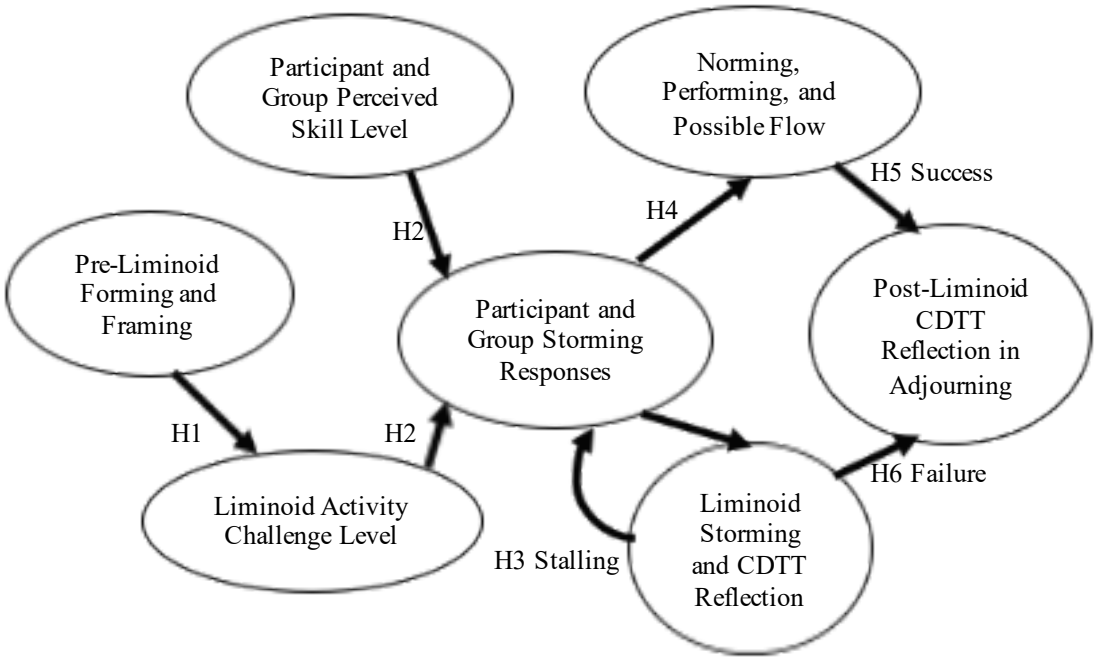


Figure 5.2 - Hypothesized MLGLS Path Model

In the findings chapter, there was a pragmatic shift away from the MLGLS model produced through the literature review. As promised in the findings chapter, this section addresses the rationale for that shift. Figure 5.1 shows the MLGLS as the hypothesized model for describing participants' experience in an MLGLS activity. The research then converted the MLGLS model into a path diagram to test using EFA, CFA, and causal SEM methods (Fig. 5.2). Next six hypotheses were presented from that model. The CFA revealed latent factors loaded by indicator variables: *GDST*, *PersInvst*, *Engro*, and *RelLearn*. The nodes of the MLGLS model nodes in Figure 5.2 were categorically different than the factors produced through CFA in an unreconcilable manner. An example happened with the variable *GDST*. The five stages of GDST spread across several nodes in the literature review model. Those nodes are labelled with "forming," "storming, "norming," "performing," and "adjourning" stages in Figure 5.2. The CFA showed that some phases of GDST loaded onto one variable: *GDST*. This difference in categorical divisions made it difficult to move forward with the original models (Figs. 1 and 2). Another issue arose as a completely unexpected variable

emerged from the CFA: *PersInvst. PersInvst* saw no major representation in the original MLGLS model or its six hypotheses. Because of issues like these, instead of using the hypothesized path model of MLGLS (Fig. 2) to start the causal SEM, this research made a pragmatic decision to develop an iterative causal SEM hypothesis just after the CFA step. Once a final, causal SEM emerged, this research compared it to the original, literature-based MLGLS model (Fig. 5.7 at the end of this qualitative analysis section). This decision allowed comparison from the original, literature review model against the final causal SEM without forcing the findings chapter to untangle the original model that had severe categorical differences.

This study also produced new hypotheses to pair with the hypothesized causal SEM as an exploratory step in this research process. The original hypotheses (H1-H6) attempted to describe a group's experience from the literature review, but that explanation appeared incongruent with the categories that emerged through quantitative investigation. Hypothesis H7-H10c were proposed and then revisited following the completion of the causal SEM (Table 5.1).

5.2.2 Positioning Findings in the Literature

The causal SEM (Fig. 5.3) included three exogenous variables and four endogenous variables. The exogenous variables measured the effect of *Unanimous* decision making, whether or not a group experienced *Success* and *Group Size.* The endogenous variables were the Group Developmental Stages Theory (*GDST*), a person's personal investment in the activity (*PersInvst*), a person's engrossment into an activity (*Engro*), and relational learning (*RelLearn*) that resulted from the Traffic Jam activity. This analysis discusses these exogenous and endogenous variables in relation to the literature offered at the beginning of this study and makes further investigation into new literature where appropriate.

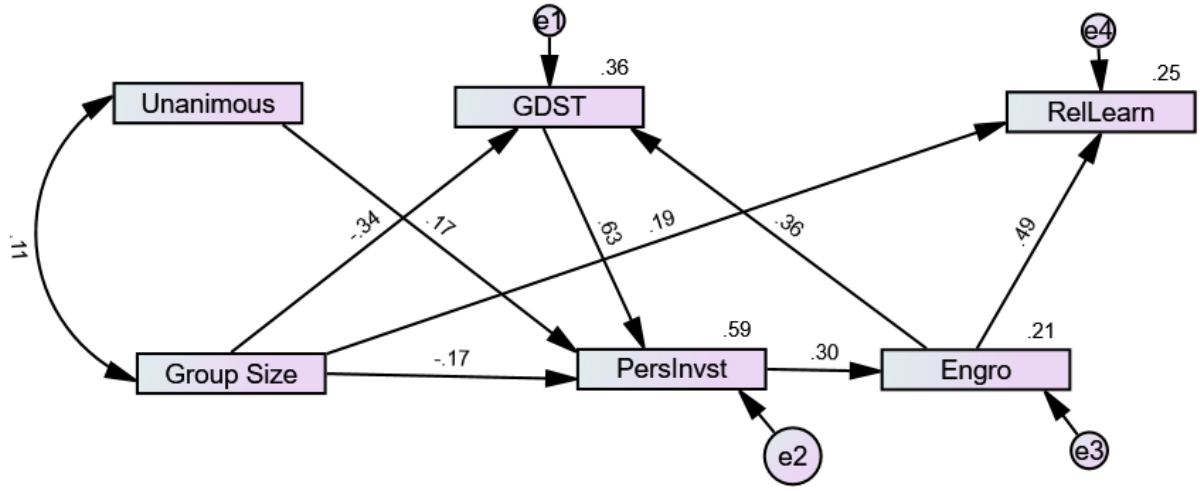


Figure 5.3 - Final, Causal SEM – Regression weights (β) appear next to paths and endogenous variables (r^2).

Table 5.1 - Final Quantitative Hypotheses Report

Final Quantitative Hypotheses Report		
Hypothesis	Relevant Evidence	Conclusion
Hypothesis 7 (H7) *GDST* influences → *PersInvst*	*GDST* directly influences → *PersInvst* with a strong (β =0.635) regression weight (*p* =0.002).	Group development indicates a supportable direct effect on one's personal investment.
Hypothesis 8 (H8) *PersInvst* →*Engro*	*PersInvst* directly influences → *Engro* with a strong (β =0.302) regression weight (*p* =0.010)	Personal investment indicates a supportable direct effect on one's sense of engrossment in an activity.
Hypothesis 9 (H9) *Engro* → *GDST* (Cyclical Process mediated by)	*Engro* directly influences → *GDST* with strong (β =0.358) *PersInvst* regression weight (*p* =0.002)	Engrossment indicates a supportable direct effect on group development. Combined with H7 and H8, there is a cyclic direct effect between group development, personal investment, and engrossment.
	Engro' influence → on *PersInvst* is strongly mediated (β =0.343) by *GDST* (*p* =0.001).	Engrossment's influence in the cyclic loop on personal investment is mediated by group development.
	GDST's influence → on *Engro* is weakly mediated (β =0.123) by *PersInvst* (*p* =0.008)	Group development's influence on a person's engrossment is mediated by a person's personal investment.
	PersInvst's influence → on *GDST* is weakly mediated (β =0.112) by *Engro* (*p* =0.004)	The influence of a person's personal investment on group development is weakly mediated by their engrossment.
Hypothesis 10a (H10a) *GDST* → *RelLearn*	*GDST* has no statistically significant effect on *RelLearn* (*p* =0.328)	Group development does not influence relational learning.
Hypothesis 10b (H10b) *GDST* → *PersInvst* → *RelLearn*	*PersInvst* mediates no statistically significant effect from GDST on *RelLearn* (*p* =0.858)	Personal investment does not influence any effect from group development onto relational learning.
Hypothesis 10c (H10c) *GDST* → *PersInvst* → *Engro* → *RelLearn*	*PersInvst* mediates no statistically significant effect from *GDST* on *Engro* (*p* = 0.858). *Engro* mediates a moderate (β =0.229) effect from *PersInvst* on *RelLearn* (*p* =0.007)	Personal investment does not influence any effect from group development onto engrossment; however, engrossment does mediate an indirect effect personal investment has on relational learning

5.2.2.1 Independent Variables

Unanimous

The *Unanimous* exogenous variable measured the binary-scored difference between two groups: participants in the control group who had no unanimous stipulation for receiving hints, and the experimental group who had a unanimous stipulation to receive hints. This pragmatic study decided to adapt *Unanimous* into an exogenous variable since insufficient sampling would not allow split-group difference tests in causal structural equation modelling (SEM). This adaptation allowed some form of interpretation into the effects of unanimity. This variable moderately influenced a participant's personal investment into an activity. This analysis consulted relevant literature on unanimity in group decision making. Groups have more difficulty making unanimous decisions and take longer to reach unanimity when compared against groups requiring two-thirds assent for decisions (Kaplan and Miller, 1987). Unlike those groups studied by Kaplan and Miller, the experimental groups in Traffic Jam did not need to make a unanimous decision to solve Traffic Jam. Instead, the unanimous hint option became precisely that: an optional side-activity for the experimental group. The motivation of making a unanimous decision promised hints. The participants did not know the hints were only techniques that could aid in the solution-finding process: the hints did not reveal the solution.

Additionally, research with mock jury groups has shown that a group required to make a unanimous decision is significantly more likely not to come to unanimity than a group required to make a majority decision (Foss, 1981). Requiring unanimity from the experimental groups for optional hints probably made them more likely to forego the hints because only one person needed to reject the hints for the group to forego them entirely. Tempering Foss' research, other research has shown that the type of decision (moral or intellectual) may influence the difficulty of reaching a unanimous decision (Kaplan and

Miller, 1987). According to Kaplan and Miller, the decisions in this experiment were intellectual (no moral component); therefore, the group was even more likely act non-unanimously toward hints. One person could thwart unanimous agreement for hints, and the intellectual nature of the decision topic decreased the likelihood of hint reception. Because of those two factors, the *Unanimity* binary variable measured the influence that optional unanimity had upon the experimental group: likely that they did not vote unanimously to receive hints.

Unanimity had a moderate direct effect on a participant's personal investment (*Unanimous* → *PersInvst*: β =0.170, *p* =0.001). *Unanimity* also had a weak indirect effect on a person's engrossment in the activity as mediated by the person's personal investment (*Unanimous* → *PersInvst* → *Engro*: β = 0.091, *p* =0.004). These direct and indirect effects suggest that a participant who had the option of receiving unanimous hints felt more personally invested and became more engrossed in the activity depending on their personal investment levels.

GROUP SIZE

The most influential independent variable included in the causal SEM was *Group Size*. As group size went up in this study, it directly affected group development with a strong negative effect (*Group Size* → *GDST: β* = -0.338, *p* =0.001). Group size also affected a participant's personal investment with a moderate negative effect (*Group Size* → *PersInvst*: β = -0.170, *p* =0.012). Finally, group size also had a moderate direct effect on a person's reflections about future groups after the study (*Group Size* → *RelLearn*: β =0.187, *p* =0.008). With respect to indirect effects, group size also displayed a weak indirect effect on engrossment as mediated by personal investment (*Group Size* → *PersInvst* → *Engro:* β = -0.019, *p* =0.012) as well as a weak indirect effect on personal investment as mediated by group development (*Group Size* → *GDST* → *PersInvst*: β = -0.112, *p* = 0.001). These

findings that larger group sizes negatively impact group development and personal investment agree with both common sense and research. One relevant example of a study into group size reviewed several pieces of research to display the effects group size had on business teams (DeMatteo, Eby, and Sundstrum, 1998). DeMatteo *et al.* (1998) comment that increasing group size caused team members to lose personal motivation. Participants lost perceived connections from their input to the group's goals as the group grew larger. While having too large a group negatively influences participant investment, working in a group does produce more personal investment than working alone. Smaller teams show improved participant investment at a personal level and group development at the group level. The final influence observed from group size affected post-activity relational reflections. It seems reasonable that reflective processes reduce for participants in larger group because they are less likely to see themselves differentiated within the context of that group (DeMatteo *et al.*, 1998). If the person cannot see their influence within the group because it is too large, they will have less reflective practice as a result. This study indicates that smaller group size is generally associated with better group development, higher personal investment, and increased relational reflections.

5.2.2.2 Dependent Variables

Group Developmental Stages Theory (*GDST*)

The Group Developmental Stages Theory variable (*GDST,* factor r^2 =0.365, p =0.002*)* represents the development process that a group undergoes while performing a task together. A group's size directly affected their development, as discussed in the previous section. A group's developmental process had a strong, direct effect on a person's personal investment (*GDST* → *PersInvst:* β =0.635, p =0.002). This finding aligns with Tuckman's suggestion about GDST, particularly about the third stage: norming. He writes, "Resistance is overcome in the third stage in which ingroup feeling and cohesiveness develop, new standards evolve,

and new roles are adopted. In the task realm, intimate, personal opinions are expressed. Thus we have the stage of norming" (Tuckman, 1965, p.396). This description of norming only happens after the initial phases of forming and storming. Norming is characterized by an element of personal investment as a participant discovers their role and expresses intimate personal opinions about the task or group. So as a group develops into the norming phase, their personal investment will follow. This allows support for Hypothesis 7 through the causal SEM in this research as well as literature on the subject. This research suggests that personal investment results when a participant perceives themselves to be in a group that is developing well.

PERSONAL INVESTMENT (*PERSINVST*)

The *PersInvst* variable measured a participant's personal investment in the MLGLS Traffic Jam activity. Questions measuring this endogenous variable asked participants to reflect on their perceived ability to share their ideas about the task with the group (Q7) and whether they acted on that perceived ability (Q30). Participants were also asked to reflect on whether they felt in control (Q19) and fully involved (Q24) during Traffic Jam. Different theories went into the design of all these questions. This research designed the questions based on these theoretical elements: the norming phase of GDST (Q7), flow-related perception of control (Q19), flow-related involvement (Q24), and mid-liminoid-related relational risk-taking (Q30). *PersInvst* arose with the strongest factor regression weight in the study (r^2 =0.592, p =0.003). This variable was unexpected because it grouped concepts that the MLGLS original hypothesis model did not account for: a person's personal investment. Much research has investigated personal investment: the reasons and motivations for why people choose to invest themselves. The theory with which the terminology of the *PersInvst* variable overlaps comes from two researchers who argued that personal investment comes from three dimensions: personal, group, and cultural context sources (Maehr and Braskamp,

1986). Personal investment theory conceptually overlaps with motivational theory (Maehr and Braskamp, 1986; Shwalb, Shwalb, Harnisch, Maehr, and Akabane, 1992; Raedeke and Burton, 2009; King, Yeung, and Cai, 2019). Personal investment theory and motivation theory both explain that personal motivation originates from internal and external sources, motivation theory describes these types of motivation as intrinsic and extrinsic (Caillois, 1958/2001; Csikszentmihalyi, 1975; Graef, Csikszentmihalyi, and McManama, 1983; Ryan and Deci, 2000). These motivational theorists studied how internal and external forces create intrinsic and extrinsic motivation. Both Personal Investment and Motivation theories would consider the participant's observation of group development as an extrinsic force. That extrinsic force could influence a person's personal investment in intrinsic and extrinsic ways. Personal Investment Theory and Motivational Theory use different categories, but both of these heavily researched theories explain the strong direct connection discovered in this study from group development to a person's personal investment (*GDST* → *PersInvst:* β =0.635, *p* =0.002). This research did not capture every type of motivation that a person experienced in the activity, but it did show that a group's development motivates positive personal investment. This literature-supported connection further confirms hypothesis 7.

With the nature of *PersInvst* in mind, what did a person's personal investment affect? A strong direct effect was observed from *PersInvst* upon *Engro* (β =0.302, *p* =0.010). This direct effect confirmed hypothesis 8 in the hypothesized causal SEM. This direct effect indicates a connection between a person's personal investment into the activity and the activity consuming their attention. *PersInvst* also indirectly affected both *GDST* at a weak level (β =0.112, *p* =0.004) and *RelLearn* at a moderate level (β =0.229, *p* =0.007) as mediated by *Engro*. This means that a person's personal investment passes through an engrossment experience, which leads to positive effects in both their group development as well as the relational lessons they learn after the activity.

ENGROSSMENT (*ENGRO*)

Engro emerged as a key variable in the path diagram because it was directly influenced by *PersInvst*, and it also mediated *PersInvst*'s effect on *GDST* and *RelLearn*. *Engro* represents that absorption into an activity that occurs as attention toward circumstances outside of the activity decrease. *Engro* is a fascinating endogenous variable because it is a theoretic component of both the liminoid space and flow states. In fact, the three questionnaire items used to measure this variable were developed based on the engrossment aspects of liminoid and flow experiences (Table 5.2). The first questionnaire item measured the process of transitioning through a pre-liminoid phase to the liminoid phase includes thinking less about daily concerns (Q25). This question aligns with liminal separation from the structure of daily activities and incorporation into a new structure required for the activity (van Gennep, 1960; Turner, 1974). Forgetting about personal problems and losing track of time can indicate flow [Q23 and Q20(Csikszentmihalyi, 1975; Flaherty, 1991)]. These three questionnaire items together describe a deep involvement that moves beyond investment: engrossment.

Table 5.2 - Construct Factor 4 - Engrossed (*Engro*)

Construct Factor 4 – Engrossed (*Engro*)		
Item Number	Questionnaire Item Wording	Theory Used to Develop Item
Q31	"While engaged in the activity, I forgot personal problems."	Flow related Forgetting of Personal Problems
Q32	“At some point during the activity, I began to think less about my daily concerns.”	Pre-Liminoid Forgetting of Daily Concerns
Q33	“While engaged in the activity, I lost track of time.”	Flow related Temporal Distortion

In Goffman's *Encounters* (1961), he describes engrossment as a spontaneous involvement where a person finds it "psychologically unnecessary to dwell on anything else. A visual and cognitive engrossment occurs, with an honest unawareness of matters other than the activity… an effortless dissociation from all their events, [distinguished]…from both

suppression and repression" (1961, pp.35-37). Flaherty links Csikszentmihalyi's flow with Goffman's concept of engrossment (Flaherty, 1991). This idea of engrossment helps understand why there was a strong path of causality towards *Engro* from *PersInvst* (β =0.302, p =0.010). The literature-supported findings depicted in the causal SEM indicate that as participants became more invested and involved in an activity, their investment positively influences their engrossment in the activity (Hypothesis 8).

Why not just deem the *Engro* variable as "flow" since Csikszentmihalyi posited that forgetting problems, daily concerns, and losing track of time would have, at least partially, indicated a flow experience (1975)? *Engro* cannot be attributed solely to flow because engrossment can also occur in liminoid communitas (Turner, 1974). Both Turner and Csikszentmihalyi recognized that liminoid and flow could co-occur (Turner, 1974; Nakamura and Csikszentmihalyi, 2014). Further, Turner proposes that flow states can happen in the liminoid space, giving way to more liminoid space, and he also stated that flow could lead out of the liminoid space into post-liminoid structures (1974). In Turner's view, flow could happen along with or separate from liminoid experiences. An overlap of the literature, as well as the concepts influencing questionnaire items, disallow the attribution of *Engro* to only Flow or Liminoid separately since Flow and Liminoid share the engrossment concept. The following section develops the overlaps and distinctions between Flow and Liminoid to better understand the *Engro* mechanism.

Turner sees overlaps between flow and the liminoid space, but he also makes distinctions between the two. One area of difference happens in liminoid communitas. Communitas is a sense of connection and identity that temporarily develops amongst people who share a liminoid space outside of the structures associated with everyday life (Turner, 1974).

Turner's discussion is critical on this point:

> what I call communitas has something of a "flow" quality, but it may arise, and often does arise, spontaneously and unanticipated - it does not need rules to trigger it off… Again, "flow" is experienced within an individual, whereas communitas at its inception is evidently between or among individuals - it is what all of us believe we share and its outputs emerge from dialogue, using both words and non-verbal means of communication, such as understanding smiles, jerks of the head, and so on, between us. "Flow" for me is already in the domain of what I have called "structure"; communitas is always prestructural, even though those who participate in it have been saturated in structure-being human-since they were infants. But "flow," for me, seems to be one of the ways in which "structure" may be transformed or "liquefied" … into communitas again. (Turner, 1974, p.88).

Turner communicates that communitas and flow are similar and different. He explains that communitas is anti-structural, involves groups, and has flow qualities; flow is individual and structural. Despite these differences, Turner states that flow can be "liquified into communitas," suggesting that flow can lead to communitas and communitas can lead to flow. He even states elsewhere in the same article,

> "Flow' may induce communitas, and communitas "flow," but some "flows" are solitary and some modes of communitas separate awareness from action-especially in religious communitas. Here it is not teamwork in flow that is quintessential, but "being" together, with being the operative word, not doing. (Turner, 1974, p.79-80)

Turner suggests that flow and liminoid communitas can instigate one another, but argues that flow only happens at the individual level while liminoid communitas occurs within a group.

In light of Turner's comments, should this research assume that *Engro* measured only liminoid communitas since it was measured in a group activity? Is it even possible to decide

which took place in the context of this study: liminoid communitas engrossment or flow engrossment? It is most likely that both took place, but examining the direct effects and indirect effects of *Engro* may shed light upon this question.

In the cyclic model (Fig 5.4) proposed by the final, causal SEM in this study (Fig. 5.3) *Engro* strongly directly affected both *GDST* (β =0.358, *p* =0.001) and *RelLearn* (β =0.489, *p* =0.001). *Engro* also exerted a strong indirect effect on *PersInvst* as mediated by *GDST* as well (β =0.343, *p* =0.001). Additionally, *GDST* indirectly affected *Engro* as mediated by *PersInvst* (β =0.123, *p* =0.008). This finding could indicate a cycle of influence (Fig. 5.4), but before reaching this conclusion another path connection was tested. A post-hoc test was conducted with the *GDST* path redirected toward *Engro* (Fig 5.5). This test produced marginal differences in model fit (Table 5.3) and in most regression weight scores except at the regression weight for *GDST* (Table 5.4). The cyclic model demonstrated marginally better model fit scores in every fit-test used for this study except for the SRMR test. Because

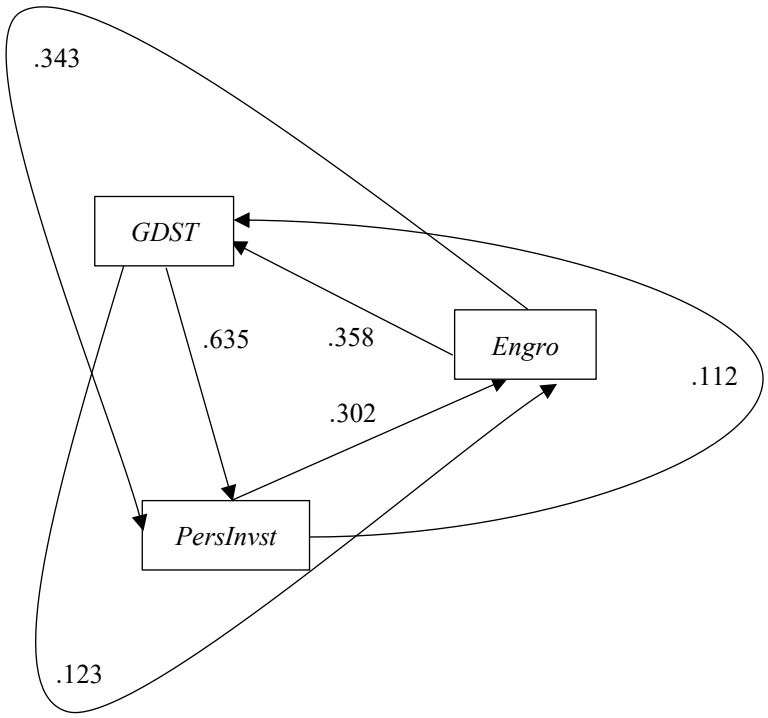


Figure 5.4 - Direct and Indirect Causal Cycle of *GDST*, *PersInvst*, and *Engro*

of the marginal differences between these two model-fit scores, the regression weights between each model were taken into consideration as well. The greatest changes when exploring the non-cyclic model were the large reduction in regression weight for *GDST* (difference of 0.212) and the loss of two indirect effects (*PersInvst* → *Engro* → *GDST*, and *Engro* → *GDST* → *PersInvst*).

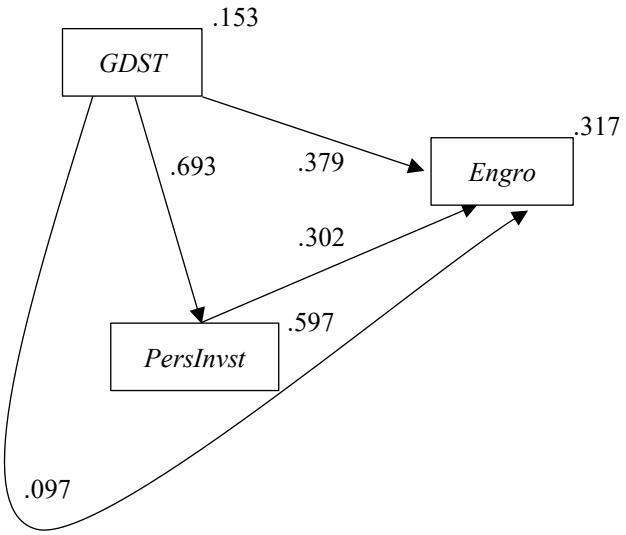


Figure 5.5 - Direct and Indirect, Non-Cyclic Causal Model of *GDST*, *PersInvst*, and *Engro*

The area where the non-cyclic model was a clear better performer occurred at the regression weight for *Engro* (difference of 0.109) and perhaps the direct influence of *PersInvst* upon *Engro* (difference of 0.082). Widely, the differences are marginal with a few, noteworthy exceptions. The most important differences favour the cyclic model as demonstrated by the higher regression weight of *GDST* and the two additional indirect effects; therefore, the cyclic model is favoured and retained in this study.

Table 5.3 - Model-Fit Indices Compared Between Cyclic and Non-Cyclic Models

Model-Fit Indices Compared Between Cyclic Model and Non-Cyclic Models								
Model-Fit Test	χ^2/df (< 3)	*p*-value of model (*p* >.05)	CFI (>.95)	GFI (>.95)	AGFI (>.80)	SRMR (< .09)	RMSEA (< .05)	PCLOSE (>.05)
Cyclic Model Fit	1.356	0.228	0.991	0.980	0.932	0.0648	0.051	0.420
Non-Cyclic Model Fit	1.420	0.203	0.989	0.979	0.927	0.0603	0.056	0.388

The cyclic set of direct and indirect effects identified in this research may have quantifiably captured the connections between liminoid and flow that Turner suggested back in 1974. Both a group's developmental process and a person's personal investment level influenced their engrossment in the activity meaning that elements of engrossment were influenced at both the group and individual level.

Table 5.4 - Direct and Indirect Path Coefficients Compared Between Cyclic Model and Non-Cyclic Models

Direct and Indirect Path Coefficients Compared Between Cyclic Model and Non-Cyclic Models			
	Cyclic Model Regressions	Non-Cyclic Model Regressions	Difference
GDST→ PersInvst	0.635	0.692	0.058
PersInvst → Engro	0.302	0.220	0.082
Engro→ GDST	0.358	-	0.021
GDST → Engro	-	0.379	
GSDT→ PersInvst → Engro	0.123	0.097	0.026
PersInvst→ Engro → GDST	0.112	-	-
Engro → GDST → PersInvst	0.343	-	-
GDST	0.365	0.153	0.212
PersInvst	0.592	0.597	0.005
Engro	0.208	0.317	0.109

Not only are these two dimensions influencing engrossment, but all three variables (*GDST, PersInvst, and Engro*) influence each other cyclically. This cyclic influence could indicate a demonstration of Turner's quote, "'Flow' may induce communitas, and communitas 'flow,' but some "flows" are solitary and some modes of communitas separate awareness from action..." (Turner, 1974, p.79-80). This cyclic process of influence confirms Hypothesis 9 (H9), demonstrating a circulating connection between a group's developmental process, a participant's personal level of investment, and a participant's experience of flow and liminoid engrossment.

RELATIONAL LEARNING (*RELLEARN*)

Engrossment (*Engro*) also influenced participants' relational learning (*RelLearn*) responses. *RelLearn* demonstrated a strong factor regression score (r^2 =0.252, p = 0.002). This research measured the *RelLearn* using questionnaire items aimed at exploring relationally-focused reflections that participants might have had following the Traffic Jam activity (Table 5.5). Questionnaire items used to measure this variable were developed from three theoretical points: Post-Liminoid Theory, CDTT bridge-building, and CDTT assimilation.

Table 5.5 - Construct Factor 3 – Relational Learning (*RelLearn*)

Construct Factor 3 – Relational Learning (*RelLearn*)		
Item Number	Questionnaire Item Wording	Theory Used to Develop Item
Q31	"At some point during this activity, whether I shared or not, I was uncertain how others in the group would respond to me."	Mid-Liminoid related Relational Sharing Fear
Q32	"Something happened in this activity that caused me to think about how I treat others."	Post-Liminoid related Relational Learning and CDTT Bridge-building
Q33	"Something happened during this activity that caused me to think about how others treat me."	Post-Liminoid related Relational Learning and CDTT Bridge-building
Q34	"Having finished this activity, I found myself considering how I would work with future groups of people differently than before."	Post-Liminoid Relational Learning and CDTT Assimilation

These items overlap theoretically because they all explore the process where participants generated knowledge about their relationships with others as a result of the Traffic Jam activity. The produced relational knowledge produced had the distinction that participants intended to apply it to future, hypothetical scenarios. This learning process happened through an experience and a debrief. Therefore, relational learning (*RelLearn*) in the context of this study refers to conclusions that participants developed following the activity that made direct considerations about how they treated others (Q32), how others treated them (Q33), and how they would like to work with other groups in the future (Q34). These questions developed with Post-Liminoid Theory (Q32, Q33, and Q34), CDTT bridge-building (Q32 and Q33), and CDTT assimilation (Q34) in mind.

The specific theoretical elements of CDTT used to develop questions measuring relational learning were bridge-building and assimilation. First, bridge-building is discussed in light of the *RelLearn* variable. A guided debrief is required to start the bridge-building process (Schenck and Cruickshank, 2015). The findings of this research came after one and sometimes two steps of debriefing. The first debrief experience in this study happened as participants completed the follow-up questionnaire. This questionnaire initiated the reflective, debriefing process. Second, many groups also participated in a verbal debrief. These debrief steps allowed this study to measure an element of the bridge-building phase of CDTT. Schenck and Cruickshank argue that the Bridge-Building "phase is the most difficult part, the student must be intentionally guided. Overt connections are made with concepts encountered during the activity and extended to new situations during bridge-building" (2015, p.88). The researcher intentionally guided participants with instructions to reflect upon their relationships with others. This guided debrief prompt included the thought about future applications of these reflections. So, the questionnaire and the debrief both incited bridge-building, allowing it to be measured in this study.

Assimilation was the other phase that a questionnaire item measured on the *RelLearn* factor. Assimilation happens when participants synthesize lessons learned in an activity and incorporate those lessons into their own functional narratives (Schenck and Cruickshank, 2015). Question 34 does this by asking participants how they will behave in future groups as a result of the Traffic Jam activity. Where questions 32 and 33 are reflective and general, question 34 asks a participant to move from the bridge-building process to incorporate their reflections into their future paradigms of group interactions.

This study intended to measure the bridge-building and assimilation reflections that participants had about their relationships with others. Assimilation and Bridge-building both occur in a fractal, iterative, experiential learning loop (Schenck and Cruickshank, 2015). If this study measured bridge-building and assimilation phases, one might assume that those fractal, iterative experiential learning loops occurred in this experiment. This research recognizes that learning loops can take months or even years to complete a cycle, so the bridge-building and assimilation studied in this research represent a small part of the reflective process that may have occurred following Traffic Jam.

RelLearn was measured using the bridge-building and assimilation aspects of CDTT, but how did other variables influence *RelLearn* in the casual SEM? *Engro* had a strong direct effect on relational learning ($\beta = 0.489$, $p = 0.001$). *Group Size* had a moderate direct effect on *RelLearn* as well ($\beta = 0.187$, $p = 0.008$), which was discussed above in the independent variables section. *PersInvst* also moderately indirectly affected *RelLearn* as mediated by *Engro* ($\beta = 0.229$, $p = 0.007$). What's interesting about these findings is what was not discovered. A direct path connection was attempted from *GDST* to *RelLearn* and from *PersInvst* to *RelLearn*, hypothesizing that good group development would cause relational learning (H10a) or high personal investment would cause relational learning (H10b). Both

paths turned out to be insignificant (*GDST p* =0.328; *PersInvst p* =0.858)[2]. There was also no significant indirect effect (*p* =0.858) from group development to relational learning as mediated by personal investment (H10b). Group development and personal investment paths could only pass through engrossment to relational learning in the causal SEM (H10c).

This analysis section has already argued that the engrossment measured in this study occurred because of flow or liminoid (or both) processes taking place. Why would that type of engrossment be the gateway factor affecting relational learning while group development or personal investment did not influence relational learning directly? Has other research demonstrated connections from liminoid or flow engrossment that lead to relational learning? This study will separately analyse current literature on liminoid engrossment and flow engrossment to understand further the *Engro* variable and its relationship within the causal SEM. This discussion keeps in mind that both Turner and Csikszentmihalyi conceptually connected the liminoid communitas experience with flow experiences (Turner, 1974; Nakamura and Csikszentmihalyi, 2014).

First, this analysis considers whether liminoid engrossment can lead to relational learning. Post-liminoid concepts influenced the design of the questions used to measure *RelLearn*, so influence from liminoid engrossment to post-liminoid relational learning could have taken place. Other research has established that relational engrossment facilitates the co-construction of knowledge between teachers and students (Goldstein, 1999), but was the engrossment in that report of the liminoid variety? In Goldstein's view, engrossment happens when a teacher steps out of their own paradigm to understand a learner's needs from the

[2] These reported scores were taken in a post-hoc investigation, but the low regression scores and insignificant *p* values associated with these paths were identified early on in the iterative process of casual SEM development.

learner's perspective. This process of stepping out of one's own view into that of another has similarities with Liminoid Theory. Applying Turnerian frames to Goldstein's view, the teacher steps away from the structure of their understanding as a teacher (pre-liminoid) into the understanding of the student (liminoid) to form a co-constructed (communitas) approach to learning. Subsequently, the teacher can then approach the student with new knowledge (post-liminoid) to aid the student. While the teacher-student is a relationship of only two, a new sense of communitas can form with the student as the teacher gains their perspective.

If these connections between Goldstein's engrossment and the liminoid space seem too inferential, other research draws the connection more clearly. As argued earlier, engrossment is an indicator of the liminoid space, in the presence or absence of flow. Quantitative leisure research demonstrated a connection between liminoid cognitive, physical, and psychological processes occurring when visiting liminal spaces that resulted in reflective insight (Bloom and Goodnow, 2013). Others have argued for and demonstrated the connection between liminoid engrossment and post-liminoid relational development (Turner, 1977; Simpson, Sturges, and Weight, 2010; Rihova, Buhalis, Moital, and Gouthro, 2014). For liminoid engrossment to affect relational learning, an element of co-construction must be present. To suggest learning happens in the liminoid space is to suggest that learning happens in community, for communitas forms in the liminoid space. CDTT describes a cyclic process that occurs both at the group and individual level, resulting in learning (Schenck and Cruickshank, 2015). Schenck and Cruickshank write, "We conceive of learning as based on relationships between all parties in the room, the individual's relationship with themselves, the environment, with the context of learning, and relationships with the content" (Schenck and Cruickshank, 2015, p.82) Other research supports a co-construction process of group and individual learning (Goldstein, 1999; Rihova *et al.*, 2014). These works support the argument that liminoid engrossment affects relational learning.

What if the engrossment (*Engro*) measured in this experiment came from a flow experience: does other research support flow engrossment that influences results in relational learning? First, this study measured flow engrossment in the context of a team activity. Many think that flow can only occur individually since Csikszentmihalyi (1975) originally studied individual flow experiences (1975). As Turner (1974) drew connections between liminoid and flow, he interpreted flow as an individual experience (1974). Research now demonstrates that groups can experience flow together (Salanova, Rodríguez-Sánchez, Schaufeli, and Cifre, 2014; van den Hout, Davis, and Weggeman, 2018). Others have also demonstrated that group flow improves group performance (Lazarovitz, 2004; MacDonald, Byrne, and Carlton 2006; van den Hout, Davis, and Walrave, 2016), and that group flow provides a more enjoyable experience for teams than individual flow (Walker, 2010). Flow research therefore demonstrates that flow can occur on both an individual and a group level.

What sort of learning outcomes eschew from these group flow experiences? Group flow researchers have found that group flow causes increased team performance (Lazarovitz, 2004; MacDonald *et al.*, 2006; van den Hout *et al.*, 2016), but does flow only improve performance or can it influence learning outcomes? One experiment investigated flow learning outcomes using academic knowledge as the learning outcome. This study observed students playing a board game based on the history of Amsterdam. The students experienced group flow states while playing the game together, but did not achieve the learning outcomes desired in the study. The learning outcomes expected facts about historical Amsterdam rather than any relational knowledge. Instead of learning about Amsterdam through the game, their game performance improved because of flow (Admiraal, Huizenga, Akkerman, and Ten Dam, 2011). The Admirral *et al.* study suggests that factual learning outcomes do not result from flow, rejecting long-term learning outcomes suggested by Nakamura and Csikszentmihalyi (2003) Other studies agree with Nakamura and Csikszentmihalyi (2003),

suggesting that flow states do enhance academic learning outcomes (Hamari, Shernoff, Rowe, Coller, Asbell-Clarke, and Edwards, 2016). Despite the numerous studies that have investigated flow, it appears that most of them seek to measure performance or academic learning outcomes. One might infer that improvement in group performance necessitates relational development for the current team, but literature appears sparse when focusing specifically on relational learning outcomes. Ultimately, this study measured a cyclic process where group development, personal investment, and flow or liminoid engrossment influence one another (H9). As this cycle occurs, that engrossment influences a relational learning process.

5.2.3 Comparison of the Literature Review Model and the Final Causal SEM

Examining the revised hypotheses (H7-H10c), this research appears to have confirmed some anticipated connections. However, going back further to the originally proposed path model of modulated liminoid group learning synthesis (H1-H6), this showed stark differences against the findings. As suggested earlier, the main differences between the original model and the final model are categorial. To depict these differences, variables confirmed through the CFA are indicated with superimposed labels over the original MLGLS model (Fig. 5.6). Figure 5.6 highlights areas of similarity between the originally hypothesized model and the actual measurements confirmed through quantitative exploration. The confirmed model measured all aspects of three-part liminoid structure: pre-liminoid, liminoid, and post-liminoid by items across three different factors (*PersInvst*, *Engro*, and *RelLearn*). Aspects of flow found representation in the measurement of both *PersInvst* and *Engro*. Forming, norming, and performing aspects of Group Developmental Stages Theory were measured by the *GDST* variable, with norming also being measured by *PersInvst*. Finally, *RelLearn* measured bridge-building and assimilation aspects of CDTT. These overlay points highlight the strengths of the original MLGLS model; however, the

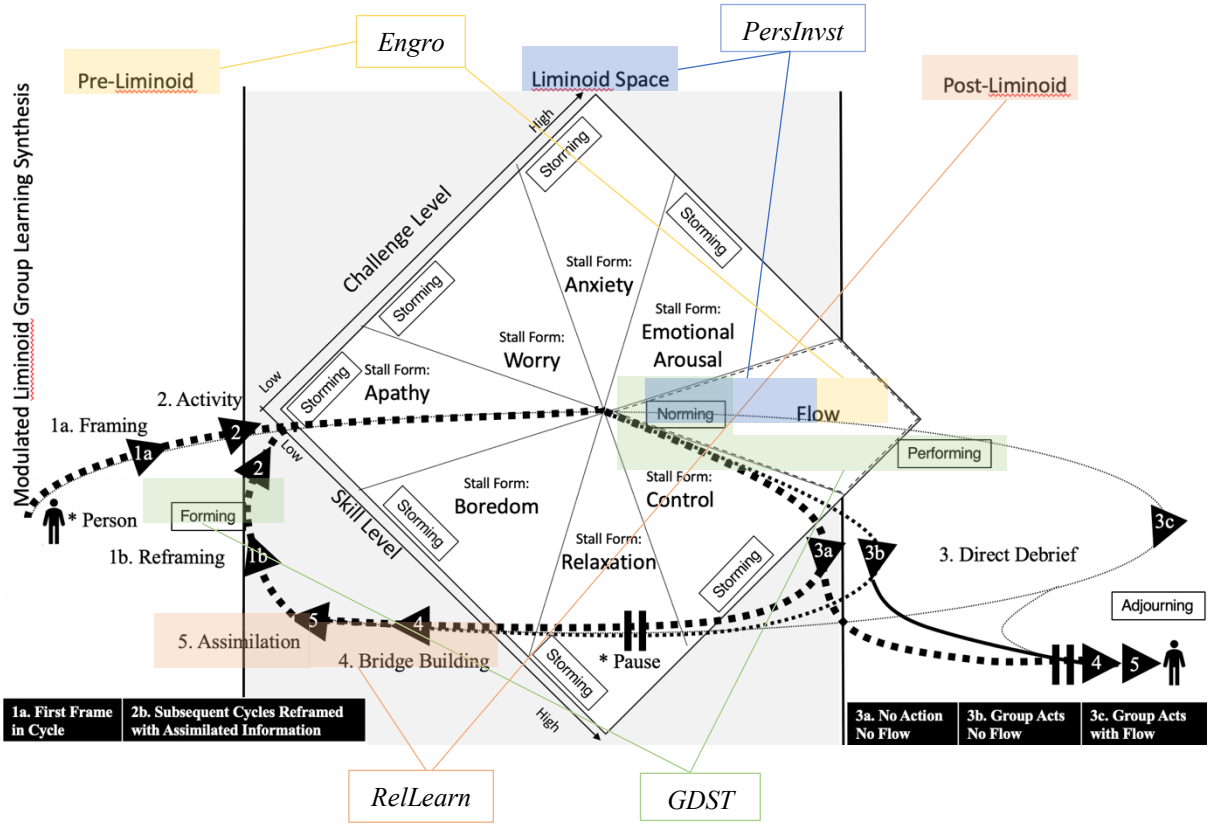


Figure 5.6 - Measured Theories Superimposed Over Original MLGLS Model

quantitative methods of this study could not confirm some of its elements. From Group Developmental Stages Theory, storming and adjourning went unmeasured. The seven anti-flow channels saw no representation in the data. From CDTT, framing, activity or debrief phases were not measured but could be implied due to the presence of the latter two points in the CDTT cycle. While the questionnaire included items designed to measure all the elements on the MLGLS diagram, many items did not load upon similar factors through factor analysis to merit inclusion in the final causal SEM. Categorical differences between the hypothesized MLGLS model and the hypothesized causal SEM factors ultimately led to a hypothesis shift. One categorical difference included the spread stages of group development across several nodes in the original model to loading upon a single factor in the causal SEM. The causal SEM variables *PersInvst, Engro,* and *RelLearn* represented different categories to those used in the original model as well. For these reasons, this research pragmatically abandoned the

original model and developed a new model iteration to explore connections between the emerging factors discovered through EFA and CFA.

5.2.4 Quantitative Analysis Summary

In summary, this research pragmatically diverged from the hypothesized MLGLS literature-review model to adopt a new model developed by iteration using exploratory factor analysis, confirmatory factor analysis, and casual structural equation modelling. The SEM in this quantitative exploration received exogenous influence at specific points from *Unanimous* and *Group Size.* This research uncovered a causal loop of influence between three factors: a group's development process (*GDST*), a person's investment (*PersInvst*), and liminoid or flow engrossment (*Engro*). The cyclic process influences relational learning (*RelLearn)* only through a participant's experience of flow or liminoid engrossment.

5.3 Qualitative Analysis

The qualitative findings of this study revealed two overarching narrative processes and three meta-themes through participants' experiences completing the modulated liminoid group learning activity, Traffic Jam. The design of this experiment developed deductively from the MLGLS; nevertheless, the qualitative aspect of this project made every effort to allow the emergence of narrative processes and themes. The qualitative aspect of the research recorded triangulated narrative observations and triangulated codes and themes. These two qualitative methods allowed this research to use case-comparison to confirm or refute observations and themes across three cases or six, case-halves. Two overarching narrative processes and three meta-themes emerged. The overarching narrative processes uncovered in this study were *Orientation* and *Application*. The meta-themes revealed through the thematic analysis were *The Group Ideal*, *Understanding the Activity,* and *Transference*.

Next, this research blended these overarching narrative processes and meta-themes (Table 5.6). The findings chapter suggested that the orientation process included two dimensions: a dimension where the group sought to orient themselves to each other and another dimension where the group sought to understand the task. Both dimensions of orientation culminated in a moment of application and success when each case-half solved Traffic Jam. Groups made false starts toward the moment of application and success throughout the activity, but these resulted in failure and resets. Resets furthered the group's understanding of their working relationships within the Traffic Jam task. Once that moment of application transpired, the researcher initiated reflective transference exercises utilizing a questionnaire, a group debrief, and a three-week follow-up email. The researcher explored data from these reflective exercises, which ultimately produced the blended processes reported in the findings. Figure 5.7 shows a simplified version of the blended processes observed in this experiment.

Table 5.6 - Overarching Narrative Processes and Meta-Theme Comparisons

Overarching Narrative Processes and Meta-Theme Comparisons			
Common Narrative Element	Overarching Narrative Process	Meta-Theme	Meta-Sub-Theme
Facilitator Explanation	*Orientation*	*The Group Ideal*	*Leadership*
Unique Group Elements			*Role Stratification*
Competition Between Case Halves			*Group Observations*
Communication Aspects			*Communication*
Hints		*Understanding the Activity*	*Understanding the Problem*
Types of Failure Experienced			
Failure Recognition Process			*Solution Strategies*
View of Resets			
Leadership Dynamics	*Application*		
Solution Discovery Process			
Success Attempt Description			
		Transference	

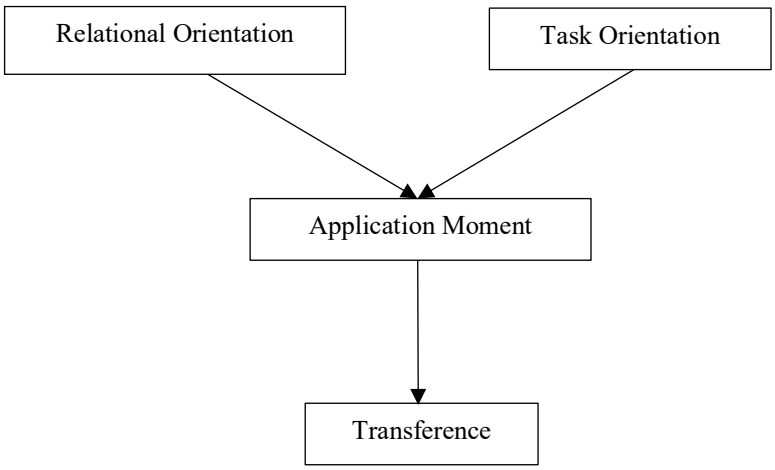


Figure 5.7 - Model of Qualitative Findings

5.3.1 Positioning Findings in the Literature

Qualitative research places emphasis on interpreting data while reducing influences upon data from outside sources such as researcher predispositions and influence from other literature. This research began with an a priori set of influential theories, but the project made efforts to allow emergence in narrative process and meta-theme discovery. After qualitative research uncovered common elements and themes from the data, interpretation of those findings took place amidst current literature (Charmaz, 2014). Where processes or meta-themes confirmed theories that influenced this research design prior to the findings, the analysis of those findings was considered deductive. Deduction describes a process of approaching a research question with an influencing theory to test the theory. Inductive reasoning asks a research question then collects data to discover emergent findings (O'Leary, 2007). If processes emerge that differ or confront the a priori theories from MLGLS, this research considers those analytic findings inductive to be.

In the findings chapter, this research allowed the common narrative elements to coalesce into even higher themes called "overarching narrative processes." Two overarching narrative processes were discovered in the narrative accounts across six case-halves: *Orientation* and *Application*. This two-step process framed the entire progression of the

group in Traffic Jam. Groups started Traffic Jam with an orientation step where they gathered both the intellectual and interpersonal resources required to solve the problem. Next, they applied those collected resources to execute the solution pattern. This two-step process may seem overly broad and simple; however, the field of research on complex problem-solving presents these two categories as the highest-level categories of understanding complex problem-solving processes (Fischer *et al.*, 2012; Funke, 2019). A problem with placing this research solely in the complex problem-solving field arises because newer research in that field tends to focus less (though not entirely) on the group and relational aspects (called "the organization") of problem-solving than this research observed (Puranam, Alexy, and Reitzig, 2014). The following sections on *Orientation* and *Application* describe these two components of the complex problem-solving process with an interrupting section about meta-themes associated with relationship and task dimension positioned between *Orientation* and *Application* discussion. The final section covers the *Transference* meta-theme which finished the activity. Overarching Narrative Processes and meta-themes are presented roughly in the order that they occurred to portray the group's development within the Traffic Jam activity. The following sections analyse the findings of the qualitative aspect of this mixed-methods project in light of current academic literature.

5.3.1.2 Overarching Narrative Process: *Orientation*

This research initially developed a hypothesized, literature review-based model called the MLGLS. MLGLS intended to describe the experience of participants within the Traffic Jam activity. MLGLS includes Tuckman and Jensen's five group developmental stages (Tuckman, 1965; Tuckman and Jensen, 1977). The five-stage group developmental theory enjoys continued acceptance in research where researchers overlay additional theoretical constructs upon its foundation (Attarian and Priest, 1991; Priest and Gass, 2018). The MLGLS and this experiment design incorporated Group Developmental Stages Theory, so

naturally, this study expected the five stages to emerge in the qualitative findings and analysis. This research attempted to reconcile the overarching narrative elements and meta-themes with Group Developmental Stages Theory. In that attempt, it became apparent that this analysis could force-fit the data into the five-stage paradigm, but the five-stage model did not *best* explain the data. Sifting through the data revealed that all the elements of the five developmental stages happened in this study; however, Tuckman and Jensen's model does not *best* explain the overarching narratives and meta-themes from this study. Forcing codes into the Group Developmental Stages Theory paradigm would indicate a retheming of sorts to make the data fit an interpretation. It seemed irresponsible to handle the emergent findings from this study by attempting a "messy fit" between the findings of this study and the Group Developmental Stages Theory categories.

The *Orientation* overarching narrative process revealed that the six case-halves observed in this research went through an orientation process followed by an application process. In this orientation process, participants developed knowledge about how the people they were working with on Traffic Jam would work together to solve it. The group needed to develop a functional understanding of the context that could be disseminated to enough group members to solve the activity in a moment of application. Back in 1951, Bales and Strodtbeck produced a study that described an initial orientation process (1951). The Bales and Strodtbeck (1951) case include two further stages: evaluation and control. First, Bales and Strodtbeck define orientation as a stage where "…members of the group must have some degree of ignorance and uncertainty about the relevant facts, but individually possess facts relevant to the decision" (1951, p.487). This phase seemed to explain the common narrative elements, *Facilitator Explanation*, *Competition Between Case Halves*, and *Communication Aspects.* This phase also incorporates meta-sub-themes *Group Observations* and *Communication*.

The second phase proposed by Bales and Strodtbeck was evaluation. Evaluation can only happen in a challenging problem. They require that the activity cannot be an "open and shut case" (Bales and Strodtbeck, 1951, p.487). The two researchers describe the other element of evaluation writing,

> "We need to be able to assume that the members possess somewhat different values or interests and that the problem is such that it involves several different values and interests as criteria by which the facts of the situation and the proposed course of action are to be judged" (1951, p.487)

The evaluation phase showed theoretical congruence with the common narrative elements *Unique Group Elements*, *Hints*, and *View of Resets*. Evaluation accounts for the two meta-sub-themes *Understanding the Problem* and *Solution Strategies,* making a complete conceptual overlap with the meta-theme *Understanding the Activity.*

Finally, Bales and Strodtbeck describe the third phase, control, as the

> "control (of the members over each other and over the common environment), [with] pressure for a group decision and the expectation of a further joint action. It is also assumed that there are a number of possible alternatives with different, and perhaps uncertain, degrees of potential frustration or satisfaction associated with various choices." (1951, p.487).

This control category explains the common narrative elements, *Types of Failure Experienced*, *Failure Recognition Process* and *Leadership Dynamics*. Placing *Leadership Dynamics* in Bales and Strodtbeck's control category makes better sense than leaving it in the application overarching narrative process because the team had to decide on a leadership style. The researcher felt conflicted about the categorization of *Leadership Dynamics* when developing the overarching narrative processes. *Leadership Dynamics* described part of the preparation process rather than the moment of application. The meta-sub-themes *Leadership* and *Role*

Stratification. The findings of this study compared against the Bales and Strodtbeck classifications are presented in Table 5.7.

Table 5.7 - Overarching Narrative Processes and Meta-Themes Compared with Bales and Strodtbeck's (1951) Categories

<table>
<tr><th colspan="6">Overarching Narrative Processes and Meta-Themes Compared with Bales and Strodtbeck's (1951) Categories</th></tr>
<tr><th>Bales and Strodtbeck Classification (1951)</th><th>Common Narrative Element</th><th>Overarching Narrative Process</th><th>Meta-Theme</th><th>Meta-Sub-Theme</th><th>Bales and Strodtbeck Classification (1951)</th></tr>
<tr><td>Orientation</td><td>Facilitator Explanation</td><td rowspan="10">Orientation</td><td rowspan="4">The Group Ideal</td><td>Leadership</td><td>Control</td></tr>
<tr><td>Evaluation</td><td>Unique Group Elements</td><td>Role Stratification</td><td>Control</td></tr>
<tr><td>Orientation</td><td>Competition Between Case Halves</td><td>Group Observations</td><td>Orientation</td></tr>
<tr><td>Orientation</td><td>Communication Aspects</td><td>Communication</td><td>Orientation</td></tr>
<tr><td>Evaluation</td><td>Hints</td><td rowspan="4">Understanding the Activity</td><td rowspan="2">Understanding the Problem</td><td>Evaluation</td></tr>
<tr><td>Control</td><td>Types of Failure Experienced</td></tr>
<tr><td>Control</td><td>Failure Recognition Process</td><td>Solution Strategies</td><td>Evaluation</td></tr>
<tr><td>Evaluation</td><td>View of Resets</td></tr>
<tr><td>Control</td><td>Leadership Dynamics</td><td rowspan="3">Application</td><td colspan="2" rowspan="2"></td><td rowspan="2"></td></tr>
<tr><td rowspan="3"></td><td>Solution Discovery Process</td></tr>
<tr><td>Success Attempt Description</td><td colspan="2"></td></tr>
<tr><td colspan="2"></td><td colspan="2">Transference</td><td></td></tr>
</table>

Bales and Strodtbeck's (1951) study gives the best-match explanation of the categories offered through narrative and thematic analysis in this study. Two additional points where their study and these findings explain one another happened. The first area of overlap involves type of data in each category. Bales and Strodtbeck (1951) observed

positive and negative feedback across the orientation, evaluation, and control phases. This study also observed positive and negative elements and themes in each category. The second area of overlap happens when Bales and Strodtbeck (1951) make conceptual room for phases to occur simultaneously: orientation can happen concurrently with evaluation or control. A dominant phase prevails in observations at a given point in time, but the other phases continue in the background (1951). This point allows the order preservation with the common narrative elements instead of forcing them into a different pattern of progression. For the Tuckman and Jensen model to work with this dataset, the order of common narrative elements would have needed to change. Conceptually, the overarching narrative processes and meta-themes discovered in this study align with Bales and Strodtbeck's *Phases in Group Problem Solving* at orientation, evaluation, and control.

Phases in Group Problem Solving offers a further reason for adopting this theoretic frame to explain the findings in this study. Bales and Strodtbeck's study design, although only qualitative, shares similarities with this study design. The 1951 study sampled populations that did not demonstrate psychological or sociological un-health, it sampled adults from their own culture, sampled from groups already bound together and invested within an organization outside of the experiment, and sampled in a single-unit activity where a group made a decision in a meeting or a conference. This research differs only in that populations were sampled from multiple cultures to make broader generalizations about group dynamics processes: Bales and Strodtbeck avoided this due to translation issues. This research advances theirs because it does sample subjects from multiple cultures. Bales and Strodtbeck (1951) would support this as well because they argue that sampling various populations in "full-fledged" challenge scenarios (involving all three phases: orientation, evaluation, and control) controls against the bias that forms from external conditions when sampling different groups. Greater sample diversity increases the researcher's ability to observe a common system across

multiple groups. The areas discussed here argue the design similarities between Bales and Strodtbeck's study and this piece of research, another reason for adopting its categories for analysis in current literature.

One major critique with aligning this research with the Bales and Strodtbeck study is the age of their research. This 1951 study described the group decision-making process for years to come, continuing to receive citation in current literature due to its innovative qualitative description of group problem-solving phases. Other researchers who reference *Phases* build on Bales and Strodbeck's study to differing ends across problem-solving, group development, organizational management and other fields (Tuckman, 1965; Gersick, 1989; Van de Ven, and Poole, 1995; Funke, 2019; Osborne, Sundström, and Bodin, 2019). Tuckman incorporated the 1951 study into his new description of group phases. Other research suggests that Tuckmanesque group developmental phases and group-problem solving phases are different (Kozlowski and Bell, 2012). Other studies build on Bales and Strodtbeck's description of group problem-solving phases to illustrate an additional aspect of problem-solving groups (Van den Ven and Poole, 1995; Osborne *et al.*, 2019). Other research dismisses the qualitative findings in *Phases* due the lack of empiricism to favouring more quantitative studies; however, those same studies cite *Phases* at the beginnings of their discussion on group problem solving because of its foundational perspective (Levine and Moreland, 1990; Funke, 2019). The value and the criticisms of the *Phases* study are fair; however, *Phases* offered a foundational description of group problem-solving that is still useful today. The value of *Phases* is that it serves as a starting point description of the problem-solving aspect in a multi-layered set of interwoven group processes. A problem for this study in using more recent research about problem solving is that more recent research becomes more categorically complex (Fischer *et al.*, 2012; Funke, 2019). This complexity pushes this research to overreach in terms of fitting its data into current research. This

research ultimately uses Bales and Strodtbeck's pioneering 1951 study because of its categorical simplicity, similarities in qualitative design, its tolerance of the common narrative element order, and it gives the best explanation for the overarching narrative process *Orientation* in the study.

5.3.1.3 Meta-Themes: *The Group Ideal* and *Understanding the Activity* as Relationship and Task Dimensions

An additional, critical reason for adopting Bales and Strodtbeck's categories for interpretation of the qualitative findings comes from a different area of conceptual overlap. Bales and Strodtbeck described their three phases in terms of relationship and task dimensions. While complex problem-solving literature understands that organizations solve problems, they place less emphasis upon the group or relational dynamic (Fischer *et al.*, 2012). Bales and Strodtbeck's inclusion of relationship and task dimensions is important to this research because the literature review developed the measurement questionnaire with these concepts (Attarian and Priest, 1991). The questionnaire development occurred with the misinformed notion that Tuckman (1965) developed the task and relationship paradigm. Unfortunately, Tuckman (1965) does not point to the source of the relationship vs. task paradigms before using these categories himself. Other scholarship picked up on these categories and developed them further based on Tuckman's 1965 article (Tuckman and Jensen, 1977; Attarian and Priest, 1991; Priest and Gass, 2018). Post-experiment analytic investigation of literature revealed that Bales and Strodtbeck (1951) framed their phases in dual dimensions of task and relationship over a decade prior-to Tuckman's work. The qualitative side of this research project moves away from the five stages (Tuckman and Jensen, 1977) because it shares more conceptual and design similarity with Bales and Strodtbeck's *Phases in Group Problem Solving,* the relationship and task categories included.

Moving the discussion to the observed themes, the duality of relationship and task dynamics became apparent in the meta-themes. One meta-theme describes the group's search for T*he Group Ideal.* Contained within this meta-theme are numerous codes discussing positive, negative, observed, or idealized relational dynamics. The meta-theme, *Understanding the Activity*, included codes that focused on understanding the rules of Traffic Jam, its challenges, and ideas about how to solve it. The meta-themes showed an observed dichotomy of relationship and task dynamics.

Returning to the overarching narrative element *Orientation*, it includes common narrative elements that are relationally-focused or task-focused, though these categories do not appear mutually exclusive. Those common narrative elements primarily having relational aspects were *Facilitator Explanation, Unique Group Elements, Competition Between Case Halves, Communication Aspects*, and *View of Resets*. Common narrative elements that helped participants understand the task were *Facilitator Explanation, Hints, Types of Failure Experienced, Failure Recognition Process*, and *View of Resets.* This research classed common narrative elements according to their primary focus: on relationship or task. Interpreting the data through the relationship and task aligns with Bales and Strodtbeck's categories in their pioneering study. Others who continue to recognize task and relationship in group dynamics (Jehn, 1997; Yang, and Mossholder, 2004; Boroș, 2020), not to mention those of the five-stage tradition who influenced the design of this study (Tuckman, 1966; Tuckman and Jensen, 1977; Attarian and Priest, 1994; Priest and Gass, 2018). Therefore, this study observed the task and relationship categories that were deductively introduced into its design.

5.3.1.4 Overarching Narrative Process: The Application Moment

The Bales and Strodtbeck (1951) study shared a surprising amount of similarity with this study; however, it could not account for the findings in this study that happens at the

moment of application. Others have identified the application phase of problem solving (Fischer *et al.*, 2012), but what is the experience of participants in that phase? Problem-solving research appears sparse on describing the experience groups have upon reaching a goal. Video recordings in this study observed a moment of application where participants applied the synthesized knowledge of their team in the Traffic Jam context to produce a solution. Participants rarely reported on this moment in debriefs, and when they did so, it was vague. *Application Moment* overarching narrative element stems from two common narrative elements: *Solution Discovery Process* and *Success Attempt Description*. The next sections will analyse these two overarching narrative elements in light of current research.

This research observed that sublime moments of application occurred across six case-halves. In these moments of application, knowledge about team and activity was blended and disseminated amongst group members. This research argues that all six of those moments demonstrated group flow experiences. First, some misconceive that flow experiences are reserved only for elite athletes thanks to popular literature (e.g. Kotler, 2014); however, Csikszentmihalyi (1975) has argued for both macro-flow experiences like those that Kotler cites as well as micro-flow experiences. Csikszentmihalyi (1997) shares a report (DeVries, 1992) of an elderly woman in a mental health centre who was able to have micro-flow experiences by practising cutting fingernails. This case of nail-trimming micro-flow is a far cry from the big wave surfers and free-solo climbers' in Koetler's examples, but it illustrates the accessibility of the flow state. Csikszentmihalyi (1997) has also argued that flow is an experience available to anyone in everyday life. Other studies observed flow in the daily life of a sample of teenagers (N =47), noting that flow occurred most frequently t while participating in arts and hobbies, socializing, and sport and games (Massimini, and Carli, 1988). These studies show that flow states are accessible by anyone. The literature review outlined eight conditions for individual flow states (Csikszentmihalyi, 1975;

Csikszentmihalyi and Nakamura, 2014); however, the application moments observed in the video recordings looked like a group flow state. The quantitative analysis section made an argument for group flow states, but this qualitative section will elaborate. The components of group flow state are outlined here as a framework for interpretation. Group flow has six precursors that must be met to produce a group flow experience: (1) common goals, (2) aligned personal goals, (3) high skill integration, (4) open communication, (5) safety, and (6) mutual commitment (van den Hout *et al*., 2016). The Traffic Jam experimental design met some of these precursors for group flow, participants reported other precursors of group flow through the common narrative elements and the meta-sub-themes. The groups studied in the six case halves eventually met all the factors related to these six conditions. The next section describes how experimental design, overarching narrative processes, and meta-themes met the six precursory conditions for group flow.

First, group members needed a common goal to achieve group flow. The common goal for each case-half was to solve the Traffic Jam problem. The group participants did not have to do anything other than participate to have this goal. Van den Hout *et al*. (2016) also argued that the goal should be meaningful. At least one case half pair felt competitive toward one another, suggesting some level of meaning within their group for the victor or the loser. A more robust observation comes from the premise of case meetings. The U.K. case met with a motivation to work on leadership: this implied meaning attached to Traffic Jam. The U.S.A. case met with a motivation for building their team cohesion. The H.K. case college students were motivated to work on Traffic Jam because it allowed them out of their regularly scheduled class. The H.K. case students expressed meaning in their own abilities at the end of Traffic Jam because they did not require hints to help solve the problems. Each group met for a reason, and this reason brought meaning to their common goal: solving Traffic Jam.

The second element of group flow requires alignment of the personal goals of participants. This point requires a return to the common narrative elements and meta-sub-themes. Many common narrative elements and meta-sub-themes were categorized in Orientation. The common narrative elements *Facilitator Explanation*, *Communication Aspects, Hints, Failure Recognition Process,* and *View of* Resets all show a level of investment on behalf of the participants because they continued to attempt the activity despite facing challenges. Also, in those meta-sub-themes, there were numerous codes where participants asked questions and made statements to understand the activity. These common narrative elements and meta-themes demonstrated widely-shared participant motivation to solve the Traffic Jam. Additionally, in the study design, participants had the freedom to depart from the activity should they no longer desire to complete the activity for any reason. Participants ultimately shared some level of personal motivation to complete Traffic Jam as demonstrated by their persistence in participating despite challenges and also due to the evidence included in observational and meta-sub-themes data.

The third condition for group flow is high skill integration. What are high skills in the context of Traffic Jam? Because no participant influenced Traffic Jam with previous experience, every participant had to develop new skills for completing the activity. Participants worked to discover and develop the required skills for solving this problem. We know this because of what they spoke most about: they wanted the right leader, good communication, and a full understanding of the problem. All of these notions appeared in meta-sub-themes across the three cases. Participants developed high skill integration through group discussion, trial, and error testing, model-construction, and drawing diagrams.

The fourth condition of group flow described by van den Hout *et al*. (2016) requires open communication within a group. Van den Hout *et al.* stipulate that open communication involves sharing on the part of the individual so that other participants within the group come

to a better understanding of the task. Throughout the activity, groups provide communicative feedback amongst themselves, discussing what might help solve Traffic Jam, as well as strategies they found ineffective. A common narrative element that demonstrated this is *Communication Aspects,* while a sub-meta-theme of *Communication* showed that participants poured effort into producing helpful communication. The best example of communication within the group happened at the end of every half-case in the application moment itself: a leader called directions while the majority of participants verbally checked their direction-giving. This feedback loop between leadership and participant on the final attempt of each half-case was a poignant moment in the interpretation of the video analysis process.

The fifth stipulation for group flow requires safety in the group. Van den Hout *et al*. (2016) defines safety as a state where

> …unnecessary and unacceptable risks are eliminated, but the possibility of failure still exists for each team member. The goal is, after all, set at a challenging level to release high skills. Therefore, failure is seen as an opportunity for growth and team members support each other…" (p. 236).

This view of safety emphasizes the safety to fail. This particular point saw strong representation from participants as they reflected on the meaning of resets. They found failure and resetting as a space where reflection or motivation occurred. While this research could not define a clear view of resets for the H.K. control case half, they repeatedly attempted the activity to learn from their mistakes. The meaning they felt as a result of resets went undiscovered in this study. Even the two cases from the U.S.A. who briefly thought they were not allowed to reset eventually came to see that it was an essential part of the process. The research design allowed participants the safety to fail in Traffic Jam, as evidenced by participants' repeated failures and reflections upon it.

final precursor required for group flow is mutual commitment. Mutual commitment must be present for a group to achieve their common goal together.

Van den Hout *et al*. (2016) wrote,

> Everyone is aware of how the tasks are distributed, the process of pursuing the target (goal), and the current state of the project. Team members support each other in creating the ideal team dynamics to achieve the common goal with task-oriented behaviour and accountability for fulfilling responsibilities (p.236).

This is observable within the cases as participants identify their leader in the common narrative element *Leadership Dynamics* and meta-sub-theme *Leadership.* Participants understand how to solve Traffic Jam as evidenced in the common narrative element *Solution Discovery Process* and the meta-theme *Understanding the Activity.* This concept was illustrated during the moments of those final success attempts: if someone almost made a mistake, another member would stop them. These examples demonstrated that team members committed themselves to arrive at the common goal together.

The groups overserved in the half cases showed commitment to each other. This commitment came from involvement in a shared task, but also stemmed from participants' organizational connections to one another. Cases consisted of classmates or colleagues who would see each other in the coming weeks, so they had a responsibility to act within their social norms. Participants commented on these role expectations in a meta-sub-theme. This organizational responsibility was a reason why Bales and Strodtbeck sampled within existing organizations as well: they desired a pre-existing commitment amidst participants in the sample (1951). Because of these pre-formed, organizational relational structures, participants were committed to each other.

All of these six stipulations could face the same critique: how can research observe that everyone experienced these six conditions. Flow theorists have suggested that

unanimously experienced individual flow states are not a requisite for group flow (Csikszentmihalyi and Nakamura, 2014). This research's primary source for the precursors of group flow disagrees (van den Hout, *et al.*, 2016).

Van den Hout *et al*. argue that

> "… while experiencing team flow, individual team members are experiencing the mental state of flow simultaneously by executing their personal task for the team. The question this raises is how a team can establish a dynamic in which this is possible, and we posit that the establishment of such a dynamic requires a set of baseline conditions, or precursors" (p.235).

The "precursors" referred to are the six elements discussed above that create an environment where a flow experience can proceed. In the observations, groups were in disjointed anti-flow states as they worked to meet the criteria for the achievement moment of group flow at the end of Traffic Jam; however, in that final moment of achievement, everyone worked in harmony, "executing their personal task for the team" (2016, p.235). Sometimes this personal task meant moving when required, other times the task was checking others' movements, and for a few others, it required offering leadership with direction. It seems theoretically possible, observationally agreeable, and supportable through data that participants engaged in a group flow experience at the application, finishing moment of Traffic Jam.

5.3.1.5 Meta-Theme: Transference

This research observed the final element, Transference, through qualitative measures at the meta-theme level. This meta-theme drifts from problem-solving research and relates more to experiential education research. The observed meta-theme, *Transference*, was the most deductive finding from the entire study. The reason for this highly deductive finding comes from the research design's inclusion of Co-Constructed Developmental Teaching Theory (CDTT) in the questionnaire and the theoretical design of the study. CDTT includes

five phases plus a pause. These phases are framing, activity, direct debrief, pause, bridge-building, and assimilation (Schenck and Cruickshank, 2015). The first three phases, framing, activity, and direct debrief, set the stage for the production of the *Transference* meta-theme in the bridge-building and assimilation phases.

The framing phase of CDTT occurred before each activity. The framed premise of each meeting included assisting with research, but each group received different motivational frames. The U.K. group met for leadership development, the U.S.A. group met for teamwork development, and the H.K. group met for a special lesson outside of their usual curriculum. These reasons for gathering all influenced the framing phase for each case. Additionally, when welcoming participants, the researcher would frame the activity with expressed gratitude for assisting with the research that included hopes that the activity would add value to participants. This expression indicated anticipated outcomes for learning. Even the participant information sheets, consent forms, and demographic intake forms framed the activity to a degree because they offered information about the activity. Case-half facilitators received the lion's share of framing responsibilities because they explained the entire activity based on a researcher-produced training video. The intended learning outcomes from the researcher were left unmentioned until the semi-structured debrief; however, the participants knew a debrief would follow each activity. The most important frames came from the reason behind the meetings such as leadership training, team-building, and extra-curricular learning.

The second phase of CDTT is the activity itself. Most activities could theoretically offer a learning experience; however, a good activity includes a real challenge for participants. Having a challenging activity encourages participant motivation. The activity cannot be too challenging in speed or difficulty, which would overwhelm participants. Schenk and Cruickshank emphasize that the challenge level of the activity should be "just right" (Schenck and Cruickshank, 2015, p.86). The activity itself should offer feedback to

participants and facilitators. (2015). This appeared to be the case for Traffic Jam. Participants found it challenging, sometimes surprisingly so. They received feedback from their facilitators about failure, and the observing researcher received feedback that influenced the debrief discussion. The Traffic Jam activity demonstrated an appropriate challenge level and produced feedback in accordance with the activity phase of CDTT.

The third phase of CDTT is direct debrief. This research practised direct debrief after each case using two measures: the questionnaire and a debrief discussion. Direct debriefing happens when a facilitator "double-checks what students take away from the activity and what is still needed to reach the psychological goal. During the direct debriefing, issues salient to each learner and the group are discussed" (Schenck and Cruickshank, 2015, p.87). The experiment included a semi-structured discussion that guided participants to discuss aspects of the experiment and how they might apply to their daily lives. The questionnaire guided reflection on relational issues that arose during the activity and asked participants how they might reflect upon these relational issues for future application in groups. Curiously, some participants answered the debrief and questionnaire in a way that corresponded with the questions, but others shared their thoughts regardless of the question. For the latter participants, question prompts were more of an opportunity to share whatever was on the participant's mind. The direct debrief steps allowed the researcher to explore the experience of participants in Traffic Jam as it related to future implications in both structured and unstructured ways.

Framing, activity, and direct debrief phases set the scene for collecting data about transference. The meta-theme Transference appears more in the reflective phases of CDTT. The three remaining phases (two phases plus a pause) of after-activity reflection are pause, bridge-building, and assimilation (Schenk and Cruickshank, 2015). The presence of the reflective pause in this experiment would be difficult to observe in this dataset. While there

were elements of the pause phase incorporated into the research design, no coded data observed this phase. The pause phase "refers to a significant break (may include sleep) in debriefing that allows for internal reflective states to consider and personalize the learning experience" (Schenck and Cruickshank, 2015, p.88). The only place where this research could have measured such a moment may have occurred in the three-week follow-up email. However, Schenck and Cruickshank also cite a study that suggests pauses may last only a few seconds in activities like daydreaming or having an "ah-ha!" moment in the shower (Immordino-Yang *et al.*, 2012). The findings of the Immordino-Yang *et al.* study about the brain's default mode (DM: Immordino-Yang, et al.'s conceptual term for pause) suggest that pause reflection may have occurred during the activity as participants were in the problem-solving process. Also, pause could have happened following the activity as participants prepared a cup of tea or visited the lavatories before the debrief. A further moment of pause might have occurred between the activity and the completion of the questionnaire as some participants completed it at home. While all of these are possible points where the pause phase may have taken place, this study was unable to measure this phase and cannot confirm through data that participants experienced pause moments.

The next reflective phase of CDTT is bridge-building. Bridge-building requires "overt connections are made with concepts encountered during the activity and extended to new situations" (Schenck and Cruickshank, 2015, p.88). This study indeed observed the bridge-building phase as evidenced by the meta-theme *Transference*. *Transference* included themes and codes as the case level, which indicated reflective connections that participants developed during their experience in Traffic Jam to future reflections about themselves and future groups. This research employed questions intentionally designed to collect data indicative of bridge-building, particularly the semi-structured debrief question "How does

Traffic Jam relate to your personal or professional life?" As a result, a great deal of data resulted in the *Transference* meta-theme pertaining to the bridge-building phase of CDTT.

The final reflective phase of CDTT that helped explain the data contained in the meta-theme *Transference* was assimilation. Assimilation happens when a person takes everything they learned from the activity through the direct debrief and bridge-building steps and incorporates it into their personhood (Schenck and Cruickshank, 2015). Amazingly, some codes in the transference meta-theme indicated this type of process as well. This finding was unanticipated because it seemed that assimilation occurred well after an activity finished according to the literature. Nevertheless, some participants had reflective moments about what sort of leader they would be in the future. Another reflected on whether or not they would devalue a person in the future as they felt devalued in the activity. These were moments of potentially deep meaning where a person took something they experienced in Traffic Jam and assimilated it into their personal paradigm.

Co-Constructed Developmental Teaching Theory's two post-activity reflective phases gave the best explanation in current literature to the *Transference* meta-theme. The reason CDTT is the best choice for explaining this meta-theme is chiefly due to the deductive nature of the questions and experiment design which incorporated CDTT. It is also important to note that the framing, activity, and direct debrief phases were deliberately included in the front-end of the experiment to produce bridge-building and assimilation phase reflections. This research was not able to capture data which indicated the presence of the pause phase. The best explanation for the *Transference* meta-theme in current literature comes from Co-Constructed Developmental Teaching Theory.

This research presents a final comment about the analysis in terms of induction and deduction. The analysis of this study shows that most of the findings were largely deductive: findings produced from literature reviewed theory that confirmed the same theory in the

analysis. Examples of deductive findings in the qualitative half of this study include: the task and relationship dimensions of the group, liminoid concepts, the co-constructed experiential learning process, and Flow Theory. Inductive findings emerged strictly from the findings and were did not necessarily result as a direct product of the literature review. Examples of truly inductive findings in this study are difficult to demonstrate because theory influenced the design of the study so heavily. However, an example of potentially inductive analysis happened when the Traffic Jam groups were discovered to more closely relate to groups in problem solving literature. Additionally, the study did not anticipate the finding of group flow upon the outset of this research, considering flow to be the individual's experience. Most of the analysis in this study comes from deduction; however, this research made every effort to allow induction to take place: producing some inductive findings around group problem solving and group flow.

5.3.2 Qualitative Analysis Summary

This research effort interpreted its qualitative data in light of current research in this analysis section. Areas of conceptual overlap across theories used in analysis of the qualitative research are depicted in Table 5.8 and Figure 5.8. Current literature recognizes the orientation and application phases in complex problem solving (Fischer *et al.*, 2012), while Co-Constructed Developmental Teaching Theory accounts for the transference related data

Table 5.8 –Areas of Conceptual Overlap in Qualitative Analysis

Areas of Conceptual Overlap in Qualitative Analysis									
Emergent Divisions	Orientation [Task (*The Group Ideal*) and Relationship (*Understanding the Activity*)]				*Application*	*Transference*			
Phases in Group Problem Solving		Orientation (Task and Relationship)	Evaluation (Task and Relationship)	Control (Task and Relationship)					
CDTT	Framing	Activity				Direct Debrief	Bridge-building	Assimilation	
Group Flow		Preparing Six Precursors for Group Flow			Group Flow				

collected in this experiment. Taking a close look at each theme, Bales and Strodtbeck's *Phases in Group Problem Solving* best explained the Orientation overarching narrative element with three categories: orientation, evaluation, and control. It also explained the meta-themes *The Group Ideal*" and *Understanding the Activity* in terms of relationship and task (Bales and Strodtbeck, 1951; Tuckman, 1966; Tuckman and Jensen, 1977; Attarian and Priest, 1994; Jehn, 1997; Yang, and Mossholder, 2004; Priest and Gass, 2018; Boroș, 2020). The concept of group flow in current literature best describes the observed application moment (Csikszentmihalyi and Nakamura, 2014; van den Hout *et al.,* 2016). Preparing for the application moment, groups advanced their collective skills to match the challenge of Traffic Jam (Csikszentmihalyi, 1975; Massimini and Carli, 1988; Csikszentmihalyi and Nakamura, 2014). Simultaneously, the groups worked to achieve the six precursors for group flow (Van de Hout *et al.*, 2016). Following the successful completion of Traffic Jam, the research employed direct debriefing resulting in data supporting the *Transference* meta-theme. This *Transference* data indicated bridge-building and assimilation taking place following the activity (Schenck and Cruickshank, 2015).

5.4 Mixed Methods Meta-Inferential Analysis

This exploratory mixed-methods research project reaches its culmination by blending the analysed findings from the quantitative and qualitative aspects of this study. The research question, "What is the experience of participants in a modulated liminoid group learning activity?" was written broadly to incorporate two methods of inquiry involved in this study. The research question represents an integrated mixed-methods question; however, the dual methods (quantitative and qualitative) employed show that the study also uses segregated aspects (Sandelowski, Voils, and Barroso, 2006). This study still classes as mixed-methods

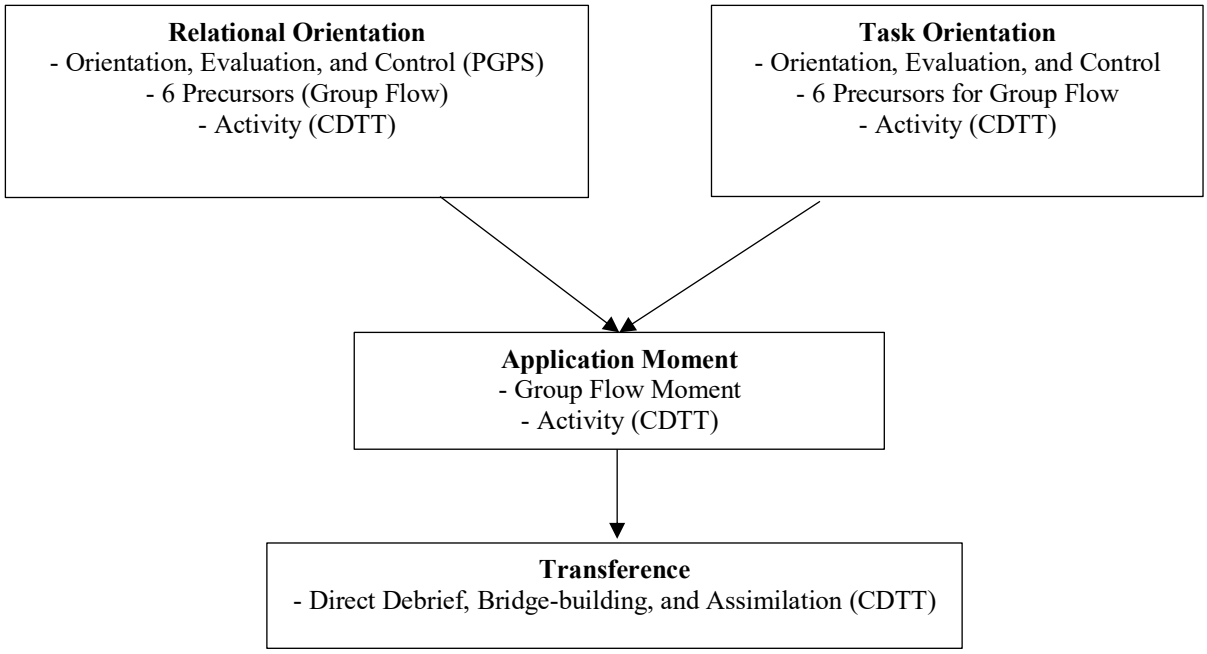


Figure 5.8 – Model of Qualitative Findings with Supporting Literature

because it demonstrates method integration as evidenced by the use of multi-methods of data collection and interpretation upon the same experiment (Yin, 2006). The analysis method used for this final mixed-methods analysis is meta-inference, which blends modelled depictions of separate method data interpretations to synthesize findings (Creswell, 2014).

5.4.1 Mixed Methods Analysis of Theories and Variables

5.4.1.1 Group Flow

Elements of flow abounded in this study, particularly around variables *PersInvst* and *Engro* in the quantitative section and on *Application* in the qualitative section. *PersInvst* loaded with two questions developed with flow concepts (Q19 and Q24) and *Engro* loaded with two questions developed with flow concepts (Q23 and Q20). Four questions influencing the quantitative endogenous variables in this study does not produce enough evidence to confirm the presence of flow during Traffic Jam. Adding the nuances described around the *Engro* variable in the quantitative section makes a stronger case for flow during Traffic Jam because engrossment accompanies flow experiences (Csikszentmihalyi, 1975; Flaherty, 1991). While these two quantitative elements indicate flow experiences during this experiment, the qualitative aspect of *Application* adds more evidence. The video recordings and common narrative elements *Solution Discovery Process* and *Success Attempt Description* illustrate this harmonious, instinctive execution of the Traffic Jam that visually and conceptually agrees with flow descriptions. Combining the quantitative and qualitative findings demonstrate that flow experiences occurred during the *Application Moment* in this experiment.

5.4.1.2 Liminoid

These analyses almost missed finding evidence for liminoid because of conceptual misunderstandings constructed in the literature review. An additional challenge to observing liminoid arose due to limitations when separately applying quantitative or qualitative methods. This section addresses both of those issues, then offers evidence of liminoid apparent in the mixed findings of this research.

First, the researcher demonstrated a conceptual misunderstanding of the emphasis of Liminoid Theory in the literature review. This paragraph illustrates that conceptual confusion:

> After extensive informal testing and interviewing with teaching assistants and students in my liminoid-focused courses, the two words that individuals most often use to describe liminoid moments in group activities are "stuck" or "stall." This sensation seems to be common for most people. Most everyone has experienced a group where progress grinds to a halt and stalls. In a study of cancer patients in a liminal space, a major theme the patients expressed was boundedness (Little *et al.*, 1998), which is perhaps a similar term to stall in that it describes "limits to space, available time, and empowerment" (Little *et al.*, 1998). In this research, stall will be the term used to express that bounded sensation which occurs in the liminoid space. (p.29)

The researcher brought presuppositions to the table about liminoid space: namely, that emphasis of liminoid was experienced difficulty indicated by group stalls. These presuppositions do not mean liminoid spaces do not involve stalling. Feeling stuck or stalled has been demonstrated as an element of liminality (Little *et al.*, 1998). This study even observed some case-halves losing momentum in their attempts to solve Traffic Jam. A handful of codes supported the presence of stall in this research too. Despite the presence of stalls in liminoid experiences, Liminoid Theory does not emphasize stalling.

Returning to the source of Liminal Theory to define the emphasis of liminality, van Gennep viewed liminality as those transitions where a person's status transformed within their cultural context. van Gennep sometimes described liminal transitions as "rites of passage." These rites of passage happened when a person separated from their community in some way, made a transition of some sort, and then re-incorporated back into their community with new status

(1960). Turner also observed this three-phase transition using pre-liminal, liminal, and post-liminal terminology. He described the pre-liminal as a separation from one's socio-cultural structure. The liminal stage involved entering into new types of communal "anti-structures" as a result of being in a liminal phase. Turner called these new anti-structural communities that formed in liminal, "communitas." Post-liminal happened when a person returned to structural society with a new status as a result of experiencing anti-structural communitas (Turner, 1969; 1974). van Gennep and Turner did not emphasize stall; instead, they emphasized the transitions that happened through liminality and the implications these transitions had on a person's status in community.

Looking through quantitative and qualitative data for stall-focused liminoid experiences revealed little, but stepping back in the mixed-methods analysis made a key element of liminoid visible across this entire research project: communitas. Part of the reason for this delayed realization comes from efforts made in the study to be true to quantitative and qualitative inquiry.

In the casual SEM, liminoid concepts were not in the model; however, questionnaire items used to measure liminoid concepts loaded onto three different factors. Q30 helped measure personal investment (*PersInvst*) in this study, which was specifically designed to measure relational risk-taking that happens during a liminoid state. Q25 loaded onto the engrossment (*Engro*) factor and was designed to measure the forgetting of daily concerns which indicates a pre-liminoid process. Finally, all of the questions for relational learning (*RelLearn*; Q32, Q33, Q34) included post-liminoid concepts in their question design because the post-liminoid phase focuses on the experienced change in the perception of current and future relationships as a result of a communitas experience. A critique of *RelLearn* could be that it would have been better named "Post-Liminoid Learning;" however, this would have minimized the theoretic overlap post-liminoid shares with bridge-building and assimilation in

CDTT. These liminoid variables (Q30, Q25, Q32, Q33, Q34) did not load onto a "liminoid" factor because they explained more model variance when paired with other variables. This could be a result of the high theoretical overlap inherent in a survey exploring multiple theories simultaneously. A reasonable conclusion adopts that liminoid concepts were involved in variables loaded onto three factors at least demonstrates an influence of liminoid concepts into the quantitative findings.

The quantitative analysis even includes a lengthy discussion about a discrepancy around engrossment (*Engro*). *Engro* could indicate a liminoid state or a flow state, and it could also indicate both states happening simultaneously. Turner and Csikszentmihalyi both felt that the flow state and liminoid communitas shared a sensation of enraptured engrossment (Turner, 1974; Nakamura, J., and Csikszentmihalyi, 2014). The quantitative findings captured liminoid concepts across five variables and confirmed co-occurring flow and liminoid communitas through a literature review. Despite these findings, establishing observed liminoid within the quantitative study alone proved difficult because the three liminoid stages did not load onto a shared, confirmed factor.

This research faced challenges in reporting liminoid concepts using solely qualitative research. Qualitative research emphasizes handling the data in a way that represents participants (Charmaz, 2014), not in a way that uses participant data to confirm a researcher's agenda. While this researcher noticed codes that included "stall" or "stuck" verbiage, those codes arose as a direct result of questions that used the word "stuck" or "stall." These questions led participants to use the words, meaning that those findings represented the measurement instrument more than the experiences of participants. Additionally, the meaning of statements, including the term "stall" generally had little to do with liminoid concepts. Looking elsewhere in the data, if any concept within the qualitative findings captured the "stall" sentiment, it was the resets. The common narrative element *View of Resets* and the

meta-sub-theme *Understanding the Problem* remarked upon the resets. The assumption that resets indicated stall and that those stalls indicated liminoid experiences seemed too inferential and misses van Gennep and Turner's emphasis about liminality. Both quantitative and qualitative aspects of this study show that emphasizing liminoid stall was an analytical dead-end.

At this point in the mixed-method analysis, the quantitative side of this research observed liminoid concepts that likely influenced the *Engro* variable. Another quantitative observation showed that liminoid concepts influenced five variables that loaded upon three different factors in the quantitative domain. However, these two observations were not enough to report liminoid as a quantitative finding. This researcher also observed liminoid-stall concepts around codes related to resetting, but these were found to be highly deductive and inferential. Focusing on liminoid-stall created an interpretational distraction in both sides of this research, and the researcher intended to reject findings of liminoid concepts in this project.

While blending mixed-methods findings into the final model for this study, a development took place. The development made it clear that this research could not reject the presence of liminoid concepts within the activity. When conducting the final blending of the quantitative and qualitative models, the key element demonstrating the presence of Liminoid Theory within this study became obvious: it was not liminoid stall, but liminoid communitas. The literature review argues that "the relevant form [of Communitas] for this research is spontaneous communitas" (p.31). Spontaneous Communitas is completely without structure or form, which Turner (1969) says would be difficult to describe with words because spontaneous communitas has a "being" quality about it. That the literature review's suggestion that the communitas in this study would prove spontaneous misunderstands the type. Instead, the communitas in this research exists as normative communitas. Normative

communitas happens "…under the influence of time, [includes] the need to mobilize and organize resources, and the necessity for social control among the members of the group in pursuance of these goals, the existential communitas is organized into a perduring social system…" (Turner, 1969, p.134). The types of conditions that Turner described appear in the overarching narrative processes Orientation and Application as well as in the meta-themes *The Group Ideal* and *Understanding the Activity*. The group developed their problem-solving resources and created a temporary leadership structure within the activity in order to solve Traffic Jam. Turner (1969) also describes normative communitas as "already within the domain of structure." (pp.134-135), indicating that normative communitas can happen within groups which are already bound by an organizational structure like the case-halves observed in this study. Following this revelation, returning to the qualitative data to interpret using liminoid, normative communitas theory would indicate a deductive approach. Were qualitative data the only view of liminoid concepts in this study, this research would remain hesitant to confirm the observation of liminoid concepts in the data.

However, using mixed-methods allows analysis across qualitative and quantitative datasets. The quantitative variable *Engro* indicated possible liminoid communitas engrossment. Another quantitative finding showed that five variables influenced the factor analysis with liminoid concepts. Additionally, an entire factor loaded with post-liminoid influenced variables. Qualitatively, both overarching narrative elements and two meta-themes demonstrate normative liminoid communitas. It may be irresponsible to completely confirm liminoid concepts through quantitative or qualitative methods separately due to lack of evidence or deduction. However, in a mixed-methods analysis, it would be irresponsible not to report this constellation of findings about liminoid, normative communitas and confirm its presence within this research.

5.4.1.3 Storming and Anti-Flow States

The literature review in this study raised an area of theoretic overlap between Liminoid Theory (van Gennep, 1960), storming from Group Developmental Stages Theory (Tuckman, 1965; Tuckman and Jensen, 1977), and the seven anti-flow states of apathy, worry, anxiety, emotional arousal, boredom, relaxation, and control (Csikszentmihalyi, 1975; Massimini and Carli, 1988; Csikszentmihalyi, 2008). The literature review hypothesized connections from the "storming" phase of Group Developmental Stages Theory to the seven anti-flow states. While these connections may be possible, participant data did not indicate a storming state, nor did participants respond in a significant way to measures exploring anti-flow states.

This study introduced two questions that specifically intended to measure experienced storming (Q5 and Q6). Neither of these variables made it into the confirmatory factor analysis as they did not explain enough common variance with other variables. This finding shows a difference between the variables intending to measure storming and the more connected (loaded) variables in the CFA.

Anti-flow states went unmeasured for different reasons: largely due to measurement errors. Questions 15 and 16 intended to measure challenge versus skill level. Incongruent scores on these two items from participants demonstrate anti-flow states. Additionally, Q17-Q24 intended to measure whether the conditions for flow were present amongst participants. Questions Q15-Q24 came from the confirmed experience sampling method (ESM) questionnaire (Csikszentmihalyi *et al.*, 1977; Larson and Csikszentmihalyi, 1983; Csikszentmihalyi and Larson, 1987; Carli *et al.*, 1988; Waterman *et al.*, 2003; Bonaiuto *et al.*, 2016). Observed variables measured off of these questions did not load onto a common factor that represented any kind of anti-flow experience.

Measurement error or interpretational choice could have caused a lack of anti-flow measurement. Perhaps choosing factor analysis for the interpretation method caused this issue. Lack of observed anti-flow states could also be attributed to measurement error related to the timing of questionnaire questions. Other research usually offers the ESM repeatedly throughout an experience, but the experience usually lasts for multiple days and includes different activities (Massimini and Carli, 1988; Kubey, Larson, and Csikszentmihalyi, 1996). Perhaps using ESM questions in the hours and days following the activity minimized reporting of anti-flow experiences. The decision to allow this freedom of response timing comes from ESM's flexibility for researchers to mould it to their methods (Hektner *et al.*, 2007). Perhaps this study stretched the ESM beyond its ability to measure anti-flow. The most glaring measurement error happened with questions 17-24 (Q17-Q24). These items intended to measure the conditions for flow to occur. They were incorporated into this study, anticipating that low scores in these items cold indicate anti-flow. Perhaps these questions should have been reverse coded for such an analysis. Another problem in measuring anti-flow states with ESM questions probably arose due to the ESM questions being posed side-by-side with other questions to measure other theories. Studies have demonstrated the validity and reliability of the ESM as a stand-alone measurement, but it did not prove as such alongside the questions used in this particular study. This illustrates the challenge of developing a questionnaire for a multi-layered understanding of group dynamics. Interpretation method choice, disconfirmation of storming variables, and measurement errors around anti-flow states show why storming and anti-flow did not emerge as findings in this study.

5.3.2 Mixed Methods Meta-Inferential Model Blending

The final mixed-methods analysis employs model blending to represent the findings of the study. This study produced two models: a causal structural equation model and a model of the qualitative findings (Fig. 5.3 and 5.8). Blending these two models required a creative effort to graphically depict areas of overlapping theory while staying true to the findings and analysis of this study (Fig. 5.9). Ultimately, the quantitative findings of this study discovered a loop of influence from a group's development, to a person's investment, to

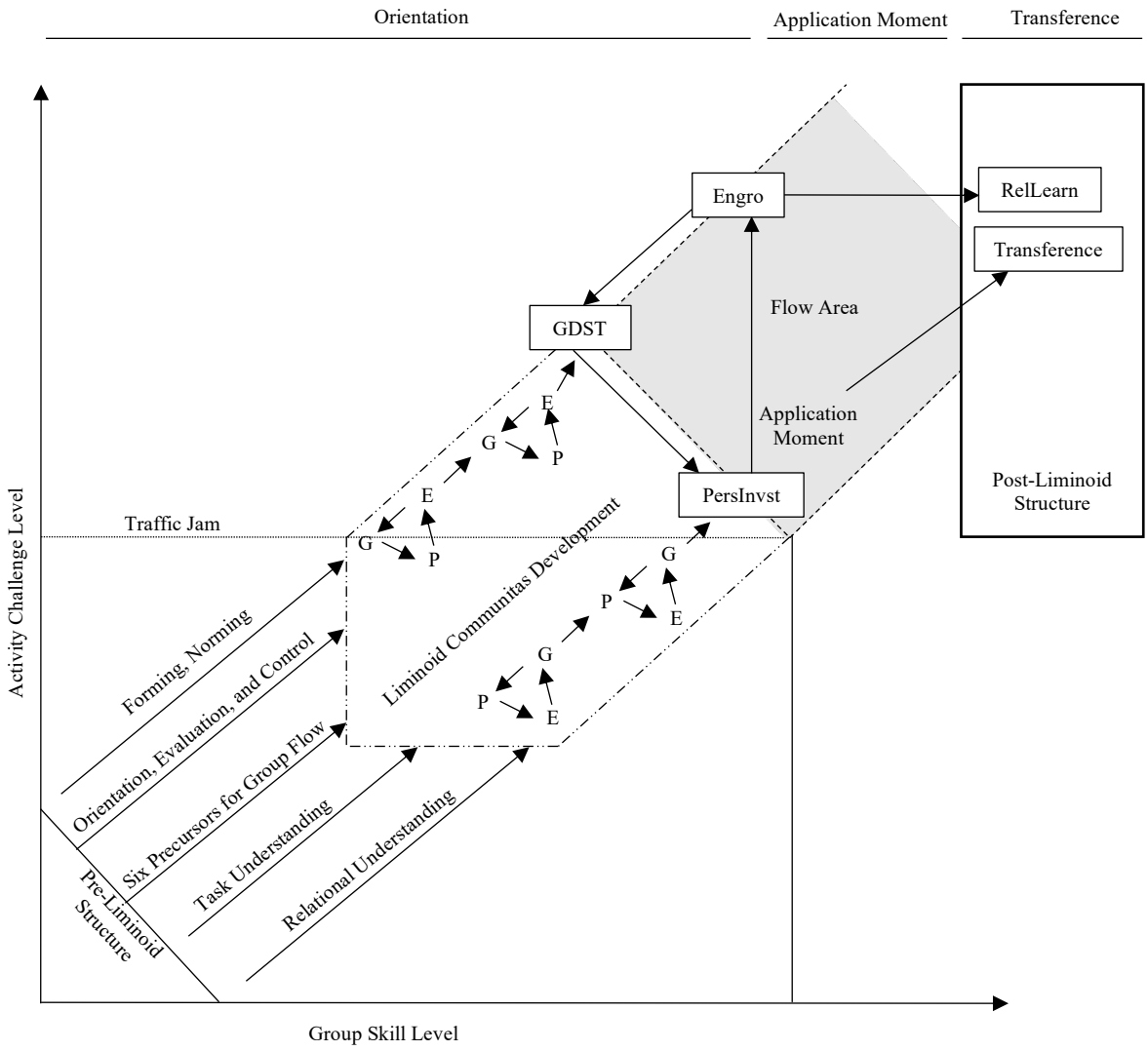


Figure 5.9 - Liminoid Group Learning Synthesis, Mixed-Methods Meta-Inferential Final Model

experienced engrossment, which influenced relational learning via engrossment. The qualitative findings showed an orientation process with relationship and task dimensions. *Orientation* led to a group flow in an *Application* moment. After this *Application* moment, a debrief produced transference reflections. The mixed-methods analysis allowed the observation of liminoid, normative communitas. All the findings and related theories from each method see representation in the final model (Fig. 5.9). This section will explain the depicted model and the rationale for its pieces.

The model description begins with an explanation of the x and y-axes that frame the entire blended model. These axes draw from Massimini and Carli's (1988) flow channel diagrams. The group was faced with the challenge of Traffic Jam, a new and surprisingly difficult challenge for the participants. The challenge level of the Traffic Jam is represented with a dotted line beginning at the y-axis (Fig. 5.10). This indicates the relative challenge level of the activity that the group must meet by raising their collective skill level.

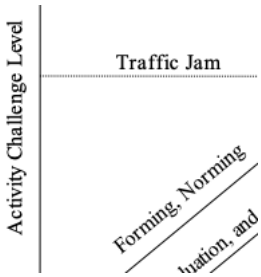


Figure 5.10 - Activity Challenge Level

The group began in the context of their pre-liminoid structure. Whatever liminoid communitas would form as a result of Traffic Jam had not yet started. Each case started the activity from a pre-liminoid structural state, represented at the bottom left corner of the diagram. From the pre-liminoid structural state, arrows emerge signifying the processes through which groups developed their shared skills in Traffic Jam (Fig. 5.11). The group's process of raising their skill level to meet the challenge level of Traffic Jam included several elements. The first arrow indicates a forming and norming element involved in increasing

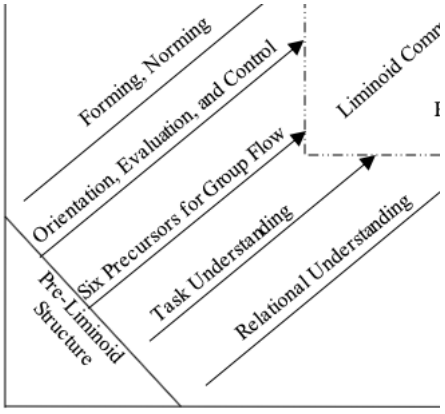


Figure 5.11 - Processes During Group Skill Development

skill levels. While the qualitative findings rejected Group Developmental Stages Theory, forming and norming phases are brought into the model because the variables which measured group development (*GDST*) included three questions which measured forming in both task and relationship dimensions (Q3 and Q4) as well as norming in the task dimension (Q8). Bales and Strodtbeck's (1951) *Phases in Group Problem Solving* is rendered on the second diagonal arrow. The *Phases in Group Problem Solving* explanation of the *Orientation* overarching narrative process is preserved because it gave a reasonable explanation for a process occurring within the data. The third arrow represents a process the group undertook towards satisfying the six precursory conditions for group flow (van den Hout *et al.*, 2016). The fourth and fifth arrow are indicative of the task-related skills and relationship skills that the group must develop amongst themselves in order to rise to the challenge of the task. These two areas represent *The Group Ideal* and *Understanding the Activity* meta-themes as well as the task versus relationship paradigm included in Phases in Group Problem Solving (Bales and Strodtbeck, 1951).

When the group processes on the diagonal arrows were underway, the quantitative methods discovered a cyclical undercurrent happening at the same time (Fig. 5.12). Through causal SEM, this research observed a circle of influence from group development (*GDST*) to personal investment (*PersInvst*) to engrossment (*Engro*). This process occurred as the group developed their skills and continued into the flow experience. The letters G, P, and E are shorthand for variables *GDST*, *PersInvst*, and *Engro*. Two G, P, and E cycles follow the five arrows to show the

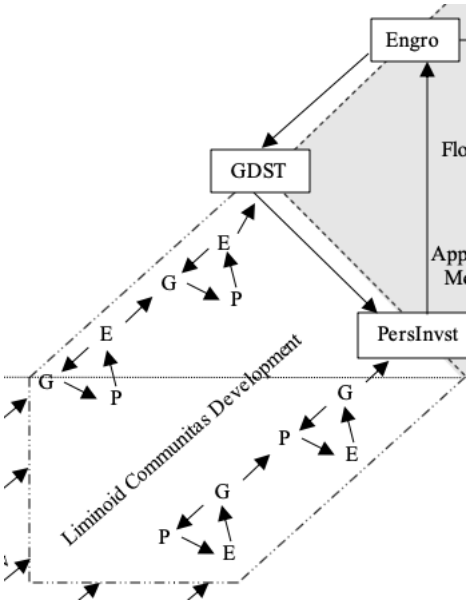


Figure 5.12 - Liminoid Communitas and Cyclic Factor Process

cyclical process between *GDST*, *PersInvst*, and *Engro* that takes place as the group elevates their skill level to match the Traffic Jam challenge level. This cycle could begin with *GDST* or *PersInvst*, but it was not possible to determine which variable started the cyclic process based on the data: they might even start simultaneously. As a result, both possibilities are rendered in the model. It seemed illogical to assume that a person begins the cycle with engrossment. A person at the beginning of this cycle would start the cycle either feeling inspired by their group's development or alternatively deciding to personally invest in the activity. As this cycle repeats itself, the group's normative communitas forms in light of this activity: they have a special, relational structure that formed to solve Traffic Jam. Finally, both possibilities lead to the larger depictions of variables *GDST*, *PersInvst*, and *Engro* that are rendered in a triangle (Fig. 5.12). As the multi-faceted cyclic group process crosses the threshold of application, the group successfully solves Traffic Jam in the application moment of group flow.

The next important area in the final model is the enlarged version of the cyclic loop from *GDST* to *PersInvst* to *Engro*. Notice how each of those three variables fall along a dotted line. On the grey side of the dotted line, a flow state is indicated: the white side indicates a non-flow state. This depiction represents how each of these three variables were measured with items indicative of flow states and non-flow states. *GDST*'s Q9 was measured on the performing phase of group development, which can sometimes indicate a flow state. *PersInvst'*s variables Q19 and Q24 both measured aspects of flow states. Finally, *Engro*'s variables Q20 and Q23 measured aspects of flow states. Because each of these variables had elements which could occur both inside and outside of a flow state, they are all rendered on the boundary of non-flow and flow states.

At the top of the diagram, the *Orientation* phase includes everything from the pre-liminoid stage up to the application moment. *Application*, representing the application

moment is the second phase. The application moment is placed in the flow area because the observed half-cases demonstrated group flow upon their successful completion of Traffic Jam. The five diagonal process arrows and the cyclic process between *GDST*, *PersInvst*, and *Engro* build in the group until they cross the threshold where group skills come into balance with the challenge level of the task. Once a group balances their skills to the challenge, a group flow state ensued in the application moment. *GDST*, *PersInvst*, and *Engro* appear to have continued forward into this application as indicated by the variables used to measure them.

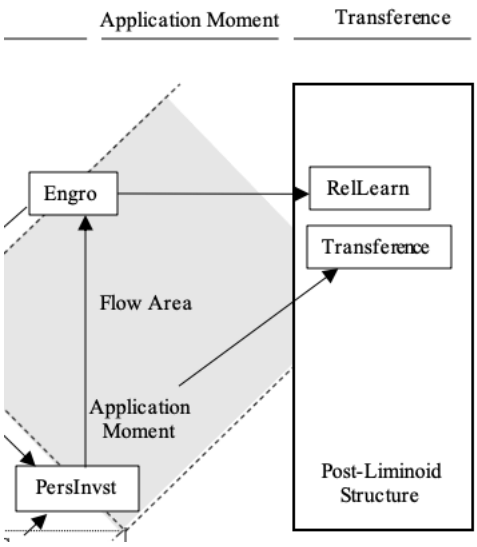


Figure 5.13 - Connections Toward Transference

Finally, the diagram depicts the quantitatively discovered connection from engrossment (*Engro*) to relational learning (*RelLearn*) as well as the qualitative connection from the application moment and subsequent Transference meta-theme (Fig. 5.13). This research concedes that it would not have measured *Transference* connections had this study not intentionally designed two direct debrief activities into the study. The third phase at the top of this model is called *Transference* to represent the meta-theme as well as the CDTT and post liminoid processes taking place there. Having a direct debrief allowed discussion about relational learning to take place. These two connections emphasize the value of the debrief with guided facilitation questions. Since Post-Liminoid Theory was involved in the production of every quantitative question used to develop the *RelLearn* variable, this debriefing phase can be understood as post-liminoid as well. While the direct debrief intentionally guided participants to reflect upon relationships, Post-Liminoid Theory suggests

that this would happen anyway as participants work to incorporate themselves back into their contextual structures after lessons learned in a normative communitas experience.

5.5 Final Analysis Summary

This research did describe some aspects of participants' experiences in Traffic Jam: a liminoid group learning activity. First, this study confirmed that when groups of people work together, complex multi-layered processes take place as they seek to achieve a task together. The analysis section found that some of the group processes in Traffic Jam were similar to those described in complex problem-solving literature. Participants' experiences when faced with a novel and surprisingly difficulty task like Traffic Jam involved an *Orientation* process of skill development. This skill development process included orientation, evaluation, and control phases while simultaneously working to achieve the six precursors for group flow. These processes involved relationship and task dimensions. While the group pursued skill improvements, a cyclic process took place where the group's development positively influenced a participant's personal investment, which in turn influenced a person's flow-like, engrossed focus on Traffic Jam. All of this group development for the purpose of solving a problem indicated the formation of normative communitas: a mini-community within an existing community structure that formed specifically to solve Traffic Jam. Observing this mini-community, communitas, in such a short span of time represents a significant finding of this study. Once the mini-community achieved a critical mass of improved skills amongst themselves, they applied their skills to the Traffic Jam problem and experienced group flow. The researcher capitalized on this flow experience with a direct debrief that led to relational learning. This relational learning was discovered to be influenced by a person's experience of engrossment in the activity. This link between engrossment and relational learning during a guided debrief also represents an advancement to literature resulting from this study.

The conclusion of this research is that problem-solving groups require participants to invest themselves in order for the group to develop. Circularly, when participants observe the group developing positively, they will invest even more into the group. These two levels of personal investment and observed group development are the key areas where the process of group development can be affected by facilitators and participants. If paritcipants invest themselves into a group that successfully develops, a temporary community will form in the group that leads to relational learning. This research also concludes that at the end of the activity, facilitators must debrief their participants in order to capitalise on the that relational learning that can take place with participants as a result of the temporary communities formed in problem solving groups.

5.6 Research Limitations

The research question asked, "What is the experience of participants in a modulated liminoid group learning activity?" While this research successfully modelled the experience of participants with specific conclusions related to participant investment, group development, liminoid communitas, flow, and relational learning, the model fell short in describing how adjustments to the challenge level might affect the group's experience. In this study, modulation described the possible effects of adjusting the challenge level of the Traffic Jam activity. This research project was unsuccess at measuring modulation effects because of inadequate sample size for conducting split-group factor analysis difference tests. The *Unanimous* exogenous variable may suggest that requiring unanimity could improve personal investment, but this pragmatically adapted variable was left out of the final model because of its binary nature. Qualitative findings showed this to be a good decision because case-halves demonstrated no outstanding behaviour to warrant their distinction. Should this study be attempted in the future, that research should require a sample size of over 200 to test for the

effects of challenge level modulation. Additionally, a different manner of challenge level modulation should be considered. Determining how to

This study is also limited because it is expressly exploratory in nature. This research aimed to pragmatically explore a new synthesis of group dynamics theories, thus offering actionable conclusions for future researchers and facilitation practitioners. Rather than being a final word on the subject, it is intended to be a first step toward a macro-understanding of interdisciplinary group dynamics processes. Exploratory studies are designed to open a conversation, so the results of this study should perhaps be more subject to further academic investigation as suggested in the areas for future research section.

A final limitation happened within the qualitative findings of this research. All of the cases qualitative reviewed in this research were chosen with a criteria that searched for richness of data in order to produce a complete picture of a case's experience. Unfortunately, groups that were unable to solve the Traffic Jam initiative also produced less qualitative data. Therefore, a limitation of the qualitative aspect of this study is that cases rendered in the findings successfully solved the problem: no unsuccessful groups are represented here. An area for future study may include the influence of failure upon liminoid group learning activity participants.

5.7 Areas of Original Contribution to Literature

This study attempted to test a synthesis of four cross-discipline theories together in the same experiment. This method appears novel despite literature recommending the presence of multiple processes co-occurring in a group (Gray, 2016; Priest and Gass, 2018). Research often focuses on an overarching theory and related, sub-theories that comprise it. For example, self-determination theory is influenced by a subordinate sub-theory that describes intrinsic and extrinsic motivation (Ryan and Deci, 2000). This research tested proven theories in psychology, sociology, and education against each other without

subordinating them to one another, producing a questionnaire to test multiple theories quantitatively and demonstrating a method of qualitative observation. In existing research, some researchers hypothesize the existence of co-occurring theories to an individual theory (Turner, 1974; Nakamura and Csikszentmihalyi, 2014; Schenck and Cruickshank, 2015). Studies often investigated two theories simultaneously (Attarian and Priest, 1994; Admiraal *et al.*, 2011; Chang, Wu, Weng, and Sung, 2012; Bloom and Goodnow, 2013; Bonaiuto *et al.*, 2016). This research effort could not find studies testing three or more top-level theories within an experiment in the same manner as this study. Research may shy away from this approach because it is difficult to attribute outcomes to influencers in this approach. Instead of focusing on outcomes and influencers, this research used a pragmatic exploratory method to explore outcomes. This research also employed mixed-methods to capture the widest range of data possible to understand a broad range of outcomes when theories were synthesized and tested together. This methodology accepted results that moved away from the original influencing theories or their hypothesized connections: for example, the original literature reviewed model (MLGLS) moved over to the finalized mixed-method model of Liminoid Group Learning. Future research may consider bundling multiple, hypothesized, co-occurring theories together to interpret outcomes under the philosophy that group processes are always co-occurring whether they are measured in an experiment or not.

This research advances literature on liminoid concepts in a few ways. First, this research observed liminoid concepts through a novel method during this experiment. Liminoid Theory received attention in the literature review and also influenced the design of this research. Historically, ethnographic methods have demonstrated a strong capacity for observing liminal and liminoid spaces (van Gennep, 1960; Turner, 1969; Thomassen, 2014). Liminoid has been quantitatively (Bloom and Goodnow, 2013) and qualitatively (Varley, 2011) described through deductive methods. Others have qualitatively described liminality

(not liminoid) using inductive methods (Little *et al.*, 1998). These studies show that it is possible to capture the liminoid space in research; however, they all observed liminal or liminoid spaces over multi-day periods of time. This study produces cutting-edge research because it captured evidence indicative of a liminoid experience taking place in a much smaller unit of a two to three-hour experimental session including an approximately 20-minute-long activity.

The next area of contribution to liminoid research focuses on its connection with flow. Turner and Csikszentmihalyi's studies that refer to each other have been cited repeatedly throughout this study (Turner, 1974; Nakamura and Csikszentmihalyi, 2014) because they represent a theorized connection that appears untested until this research project. Turner (1979) later developed the theorized connections between flow and liminality further through ethnographic analysis. Other researchers continue to mention the connection (Bloch, 2000). However, it appears that the connection between flow and liminal or liminoid concepts has not yet been tested through quantitative methods or qualitative methods other than through ethnographic observation.

The third area in which this research advances the literature on is concerned with liminoid concepts which connect with group development theory and group problem solving theory. Quantitative and qualitative data presented in this study relates to a longstanding field of group development (Tuckman, 1965; Tuckman and Jensen, 1977), and complex problem solving (Bales and Strodtbeck, 1951; Fischer *et al.*, 2012). Flow sees common discussion in group development and problem-solving research (Admiraal *et al.*, 2011; van den Hout *et al.*, 2016; Berger, Hanrahan, Bizarro, and Henning, 2018) It seems that liminal or liminoid concepts have not yet been quantitatively or qualitatively measured in current group developmental or complex problem-solving research publications.

This research advances current understandings about *how* group dynamics influence relational learning. Research has demonstrated that group cohesion and personal involvement positively influences relational learning (Jirasek and Dvorackova, 2016). Jirasek and Dvorackova (2016) even make a comment in their article toward a possible connection between outdoor learning community, rites of passage (Andrews, 1999), and experiential learning. This study explores that mechanism to a greater extent, finding that a liminoid and flow engrossment lead to a post-liminoid debriefed phase where relational learning happens. The multi-theory synthesis used in this exploratory study produced a layered understanding of group processes that illustrate a new mechanism between group cohesion and relational learning. This study built on Jirasek and Dvorackova's (2016) work, identifying a cyclic process of perceived group development, personal investment, and engrossment in liminoid communitas that influenced relational learning through a direct-debrief within a post-liminoid state. This research's attempt to test multiple layers of theories simultaneously allowed for such an advancement to current literature.

This research advanced current literature by attempting a pragmatic, mixed-methods, exploratory study of multiple top-level theories simultaneously. Three advancements in the discussion of liminoid concepts came out of this study: a novel observation of liminoid activity in a short time span: the observed connection between liminoid and flow in a quantitative and qualitative study, and, the connection of liminoid concepts in group development and problem-solving research. Finally, this research advanced literature around the multi-layered, cyclic process of group development that leads to relational learning.

5.8 Implications

5.8.1 Implications for Facilitators

The first implication of this research for facilitators suggests the importance of offering the correct level of challenge for groups. This implication comes from the

experiment design. In the experiment, the researcher offered the activity to participants through a facilitator and allowed them to work to find the answer. The participants nor the facilitator knew how to work out the answer; they had to build their own skillset up to rise to the occasion. Group problem solving focuses on this in activity skill development processes (Bales and Strodtbeck, 1951; Fischer *et al.*, 2012). This research showed just how important it is for facilitators to offer activities to their participants that are genuinely challenging, what Bales and Strodtbeck (1951) called "full-fledged" and what. Schenck and Cruickshank (2015) describe as a "goldilocks zone" activity, suggesting that an activity should be challenging to a group of participants without being overwhelming. Facilitators should offer a truly challenging, yet not overwhelming, activity and provide enough time, space, and support for their facilitated group to experience normative communitas and all the skill development involved in that process. This experiment demonstrated that such a possibility could be achieved through a logic puzzle like Traffic Jam, but any activity will suffice as long as it offers a true challenge to participants. Through an appropriately challenging activity, liminoid communitas developed and relational learning outcomes resulted in post-liminoid debriefing. Facilitators should offer appropriately challenging activities to allow communitas to form and to create a platform for maximized relational learning.

Following that point, this study also showed the importance of a direct debrief. It appears that due to the post-liminoid phase that participants reflected upon their relational states following communitas anyway; however, more focused learning is possible if the facilitator prepares the activity for group learning and follows up with relationally focused debrief questions. These questions should emphasize not just the current context but possible future applications as well. This is an important implication because relational learning prepares participants to offer improved contributions to future groups.

Another implication of this activity shows that groups can be facilitated with facilitators who are unaware of the solution but only have the steps to achieve the solution. Complex problem-solving literature affirms this implication because a lack of solution is inherent in problem-solving (Fischer *et al.*, 2014; Funke, 2019) The groups in this activity were facilitated by participants who did not know how to solve Traffic Jam. The implication here is that facilitators do not always need the answer to lead a group to success as long as there are resources to support the group in the process of discovering the solution. The researcher did not rush in to offer help to groups: I, as the researcher, remained removed from the situation in order to observe how groups developed with both leader and participants who did not know the solution. This decision kept the researcher from short-circuiting the challenge level of the activity. Practitioners should receive encouragement that it is possible to facilitate a group without knowing the solution. This implication also admonishes facilitators against making a problem easier for a group because it could possibly disrupt communitas development and resulting relational learning.

For facilitators of problem-solving activities wishing to use liminoid concepts in group activities, this study has an implication. This study erroneously focused on stalling as the key element in liminoid communitas, incorrectly thinking that shared struggle and difficulty produced relational learning. Liminoid concepts emphasize the formation of temporary communities which results in post-liminoid relational learning. Facilitators should capitalize on the relational development that they see in the formation of liminoid communitas within a problem-solving activity using a direct debrief after the activity which focuses on relational and community development. Debrief questions should include opportunities to reflect on the current activity as well as implications for participants in future, hypothetical group scenarios. As stated in the literature review, rites of passage and the term “liminal” are not appropriate tools for facilitating these short, group problem-solving

activities. Instead, liminoid group learning activities should be used as a tool that allows participants to make relational inferences that they can apply to post-liminoid, structural communities that they involve themselves in regularly.

5.8.2 Implications for Participants

Facilitators do not always find themselves in situations of group dynamics. Frequently, they themselves are on teams working with others to solve problems. An implication at the participant level suggests that a person could influence a group in a few ways. They could personally invest, jump starting the group-development cycle observed in this study. A person could also assist with developing skills amongst their group by disseminating pertinent knowledge about the activity and the people working on the team to the rest of the members of the group. Disseminating knowledge amongst the group aids the orientation process, thus assisting the group's elevation of their skills to achieve the task. This study suggests that a participant holds a great amount of power in the group development and problem-solving process.

5.8.3 Implications for Outdoor Learning Facilitators

This research suggests a final set of implications for outdoor learning facilitators. This research initially developed from the outdoor education discipline, drawing inspiration from outdoor learning resources (Attarian and Priest, 1994; SROM, 2012; Varley, 2012; Priest and Gass, 2018) as well as resources widely adopted by many outdoor facilitators (Tuckman, 1965; Tuckman and Jensen, 1977; Kolb, 1984/2018; Csikszentmihalyi, 1975). Not to mention this research was designed around an activity that was developed by an expert in initiative groups and ropes courses challenges (Miles and Priest, 1999; Rohnke, 2009).

This research's literature review suggested that liminoid concepts were preferable to liminality in outdoor learning. Outdoor learning facilitators have long desired to facilitate relational growth and maturity processes for learners, but used liminal rites of passage as the

means toward that end (Bell, 2003; Beames, 2004). The implications of this study for outdoor learning show shows that liminal rites of passage are not required for interpersonal, relational development. Instead, a Liminoid Group Learning activity with a relationally-focused debriefing procedure produces the desired outcome. This also removes potential pressure on learners and facilitators who expect the learners to make significant rites of passage transitions in the outdoor learning environment (e.g. from adolescent to adult). Peter Varley (2012) observed the liminoid in outdoor activities and Polley and Thomas (2017) researched transformational learning (a liminal concept) in outdoor education. The Bloom and Goodnow (2013) study showed that participants had liminoid experiences as a result of adventure travel. This research goes a step further and suggests that facilitators can select challenging activities in liminoid, "adventure travel" locations to facilitate liminoid, relational learning among their participants.

This study supported the importance of "full-fledged" (Bales and Strodtbeck, 1951) or "goldilocks-zone" (Schenck and Cruickshank, 2015) challenges to induce the processes around liminoid communitas formation. A central task for outdoor learning facilitators usually involves selecting an appropriately challenging activity in an adventure travel location. Therefore, the main implication of this study for outdoor learning facilitators is that appropriate challenges in adventure travel locations can be used for relational learning debriefing. For example, when leading an introductory outdoor living course, preparing a meal in the outdoors over camping stoves is a customary learning activity. This type of activity has relational components if students work together to prepare meals. This meal preparation activity may also offer novel challenges for some students who have never prepared a meal outdoors. The outdoor facilitator could use this appropriately challenging activity (assuming novices take an introductory course to outdoor living) in an adventure setting to have a debrief about the group dynamics following the meal. This is just one

example, but this research offers it as an extremely practical example of using outdoor challenges in adventure locations for relational learning. If the skillset of the group is higher, the facilitator would need to choose different activities to introduce challenge levels based on the skill level of their group in order to have relational learning debriefs.

5.8.4 Cross-Disciplinary Implications

While the outdoor education discipline inspired this study, the implications of this research extend far beyond that single academic category. This research could prove useful in facilitating sport teams, business and management teams, education cohorts, healthcare departments, and a litany of other sectors. Such a suggestion is evident based on the variety of group types sampled from this study. Ultimately, this research studied problem-solving groups; therefore, it stands to reason that the findings of this study would be applicable in any context where a group is working together to solve problems. No matter the type of group at hand, a participant always has the power to influence the group development positively by personally investing in that group. Likewise, a group's healthy development will influence a participant's choice to personally invest. Finally, in any problem-solving group, a facilitator should be encouraged to capitalize on relational learning through a debrief following an activity. These implications do not require a particular context to hold true, and therefore should be taken by professionals across varying circumstances to capitalize on group development and relational learning.

5.9 Areas for Future Research

This project used a novel, exploratory questionnaire which confirmed 14 variables loaded across four latent factors. Future research could endeavour to re-test this questionnaire as a further measure of confirmation. Additionally, future research could include additional items to provide more robust measures of each latent factor. Adding additional items could also allow new theories to be tested alongside *GDST*, *PersInvst, Engro*, and *RelLearn*.

Perhaps the qualitative findings of Liminoid Theory could be loaded onto a variable using the liminoid inventory chosen by Bloom and Goodnow (2013)? This exploratory research produced a questionnaire that opens up several directions for further research. The questionnaire demonstrates the difficulty of creating discrimination amongst theoretical constructs when they are tested side-by-side. Hopefully, this research encourages other researchers to test multiple theories together and develop co-functioning theory sets describing other multi-layered processes.

Another area for future research centres around modulation. This research developed with the idea that a facilitator could modulate the liminoid space by increasing or decreasing the challenge of it through the option of unanimously requested hints. While the possibility of modulation went unconfirmed in this study, the *Unanimous* variable showed some influence onto the final, causal SEM. This suggests that better measures toward understanding how influencing exogenous variables affect the model in this study could offer facilitators options for increasing or decreasing a challenge level to influence greater communitas development which could result in improved relational learning. It could also aid facilitators who overshoots or undershoots the appropriate challenge level of an activity with a given group. Understanding how to modulate a group to make the challenge level appropriate again could help facilitators support their groups for maximum learning. Future research could investigate how facilitators might influence a group's perceived challenge or skill level, group development, a participant's personal investment, engrossment, or experienced communitas and how these mediate the relational learning outcome in the post-liminoid space.

Another area for future research relates to groups that do not work together well. This study attempted to measure the storming and anti-flow states. Findings did not emerge in this study that rendered reliable descriptions of group difficulties, perhaps due to method choices. How do liminoid group learning activities change when group conflicts occur? Can conflict

thwart the development of liminoid communitas? These questions cannot be answered by this study but would lead to helpful investigation because conflict is a natural part of group experience.

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7. Appendix A: Index of Figures

8. Appendix B: Index of Tables

9. Appendix C: Questionnaire Design

9.1 Introduction

This appendix presents all 45 questions offered in a newly developed questionnaire instrument designed to test the Modulated Liminoid Group Learning Synthesis. The 45 questions consist of 36 quantitative and nine qualitative questions. The design of this questionnaire shows creativity in developing theory-based questions and blending groups of questions. Blending groups of questions from various theories allowed this research to explore whether participants experienced multiple group processes simultaneously in Traffic Jam. The reader will find this section to contain some miscalculations and errant assumptions that the researcher made during the questionnaire design. The analysis chapter addressed mistaken assumptions incorporated into the questionnaire design. The main errors pertain to an emphasis of stall in liminoid as opposed to communitas. Another flaw in this design allowed employment flow condition questions to measure anti-flow states. This section preserves those errant suppositions in order to display the research process and to inform future researchers who may potentially make the same mistake.

Through factor analysis, this research discovered these errors and corrected them. Factor analysis also disused questions that did not share enough variance with other questionnaire items. The analysis chapter represents the resulting, confirmed variables and factors; however, this appendix focuses on displaying the pre-experiment process that developed the initial questionnaire.

Concerning format, this appendix presents all questions in the order they appeared on the questionnaire. Questions are presented with a "Q" followed by the question number. Questions appear in boxes in this appendix with the theories used to develop the question immediately underneath the box in square brackets. The questionnaire begins with Q3 instead of Q1: Q1 and Q2 are omitted from this report because they asked for names and consent

from participants. Qualitative questions designed to collect narrative data did so by asking participants for elaboration on a previous quantitative question. Qualitative questions have an "a" following their question number. Qualitative question numbers match the quantitative question number which they elaborated. For example, Q12a asks for qualitative elaboration based upon Q12. Comments on each question's development appear beneath the question. If theory went into a set of questions, those comments appear at the heading level above the question group.

To begin, the questionnaire designed for this research effort aimed to answer the research question: "**What is the experience of participants in a modulated liminoid group learning activity?"** Quantitative questionnaire items were developed to answer this research question. Elements from four theories influenced those quantitative questionnaire items: Group Developmental Stages Theory (GDST), Flow Theory, Liminoid Theory, and Co-Constructed Developmental Teaching Theory (CDTT). The final questionnaire includes 36 quantitative scale items, most of which use one to nine scales responses. One indicated that a participant very strongly disagreed and nine indicated very strongly agreed. Scale data allowed a statistical exploration of participant experiences within Traffic Jam. The questionnaire includes an additional nine questions designed to collect qualitative, narrative data. Qualitative questionnaire items built upon the quantitative questionnaire items by asking for elaborative narrative data about a scale response. This research uses the resultant narrative data to construct an observational narrative and to conduct a thematic analysis. Quantitative and qualitative questions produced a mixture of data types that the research project analysed and blended into mixed methods findings.

The questionnaire development process included three piloting steps before the questionnaire saw implementation in the full-fledged research. First, teaching assistants familiar with the MLGLS and its fundamental theories reviewed questionnaire items to offer

input. They critiqued question clarity and helped decide whether questions might successfully measure their intended theories. Second, a remote assistant offered the questionnaire as a post-test measure to a non-split (no control or experimental groups) group who completed Traffic Jam. Unfortunately, this measure yielded little feedback to the questionnaire itself as the responses included no discussion about the questionnaire. Finally, this research piloted the questionnaire with a full-fledge pilot group, and conducted a debrief specifically about the questionnaire. As an additional measure of questionnaire screening, a test for the reliability of the questionnaire items using Cronbach's α (Cronbach, 1951) was conducted to determine whether the α score would increase if particular questions were removed. This research used those reliability scores hesitantly because of the small sample size of the pilot group, but this measure allowed for a precursory insight into whether questionnaire items observed a common phenomenon (MLGLS). The most important change to the questionnaire came from pilot study participants who reflected upon their longstanding relationships. The pilot study participants had worked with each other for two years before participating in the Traffic Jam activity. They suggested that some questions in the original questionnaire were confusing in light of their longstanding relationships as classmates. Many questions were changed to emphasize the words "this activity," in hopes of alleviating the confusion. The questionnaire aims to explore experiences as a result of Traffic Jam specifically, rather than measuring the entirety of the groups' history. Piloting measures aimed to produce clearer questions for respondents.

The questionnaire aimed to collect data to explore whether the Modulated Group Learning Synthesis is a viable framework for understanding and facilitating groups. Questions for this questionnaire come from the theories used to create the MLGLS, maintaining a low-inference, succinct, and clear question format (DeVellis, 2006). The following section will explain how each theory from MLGLS influenced questionnaire items.

Using theory to influence questionnaire items shows good practice in exploratory questionnaire development.

Lavrakas says that,

> A list of concepts of interest and how they relate to one another aids in selecting specific questions to include. These concepts are transformed into (i.e. operationalize as) survey questions that measure the concept in some way, proceeding from abstract concepts to [specific] measurements (2008, p.656).

Lavrakas explains that theory should influence each questionnaire item. If theory drives the research question, theory should in turn, help define the tool to test the research question. This appendix reports the theories used to develop each questionnaire item in brackets underneath each question.

9.2 Group Developmental Stages Theory Questions in Task and Relationship Dimensions

The first theory incorporated into the Modulated Liminoid Group Learning Synthesis and this research's questionnaire is Group Developmental Stages Theory (GDST) in both task and relationship realms. Bruce Tuckman noted four stages of group development which occurred in both "interpersonal vs. task" realms (Tuckman, 1965). The original stages Tuckman put forward were: "forming," "storming," "norming," and "performing." Subsequent studies sought to observe the Group Developmental Stages in research efforts. One researcher observed Tuckman's group stages in a small population of isolated researchers at the Antarctic research camp (Smith, 1966). Another research effort qualitatively observed Tuckman's hypothesized stages in task and relationship dimensions in classroom teams (Runkel, Lawrence, Oldfield, Rider, and Clark, 1971). Runkel *et al.* gave succinct definitions for the four group developmental stages in both task and relationship dimensions. The first set of definitions corresponds with the task dimension of the four group

developmental stages: "(1) orientation to the task [forming], (2) emotional response to the task demands [storming], (3) open exchange of relevant interpretations [norming], and (4) the emergence of solutions [performing]" (Runkel *et al.*, 1971, .p.181, bracketed items added for clarity). The second set of Runkel *et al.*'s definitions correspond to the relational dimension of Tuckman's four group developmental stages: "(1) testing and dependence [forming], (2) intragroup conflict [storming], (3) development of group cohesion [norming], and (4) functional role-relatedness [performing]" (1971, p.181. bracketed items added for clarity). While these definitions progressed research on the four stages of group development, a new stage would later see inclusion in Group Developmental Stages Theory.

The new, fifth stage added to the four-stage model described how groups came to a close, called adjourning (Tuckman and Jensen, 1977). Tuckman and Jensen synthesized all group developmental stage research up until that point, then introduced their familiar five-stage model. The five stages of group development were: forming, storming, norming, performing, and adjourning (1977).

While Runkel *et al.* described the task and relationship dimensions of four stages, Attarian and Priest add nuance to the task and relationship interactions in each stage of small group development (1994). Attarian and Priest supposed that each group stage requires varying priorities on a continuum of task versus relationship (1994). Attarian and Priest's article is pivotal like Tuckman's (1965) and Tuckman and Jensen's (1977), but has only one case study in the article to illustrate the theory. This research asks questions exploring whether group members experienced the group developmental stages and whether they prioritized task and relationship at different points throughout Traffic Jam.

Asking group members to report their own group developmental stages paradigm may present a novel approach. While this approach does not allow for moment-by-moment analysis, it does allow for group members to report their experience following Traffic Jam.

This method produces measurable data. Usually, researchers qualitatively interpret the development of the group without necessarily collecting reported data from the group themselves (Smith, 1966; Runket, et al., 1971). Questions designed to measure GDST and task versus relationship used theoretic definitions discussed by Tuckman (1965) Tuckman and Jensen (1977) and Attarian and Priest (1994). As a result, this research produced thirteen questions which examine each of the five group developmental stages in both dimensions of task versus relationship. These questions intend to collect data about the experiences of participants in Traffic Jam in light of Group Developmental Stages Theory in task and relationship dimensions.

9.2.1 Forming

These first two questions (Q3 and Q4) in the questionnaire seek to understand both the task and relationship dimensions in the forming stage. Q3 explores the extent to which a participant gave any attention to understanding the task's goal, a primary factor in beginning any activity. Q4 explores the extent to which a participant sought to understand the people they were working with, an indicator of the forming stage of group developmental stages within the relational dimension. These two questions should yield data about whether a group has started forming in respect to the task and relationship dimensions.

Q3) Rate the degree to which you agree or disagree with the following statement:
"At some point during this activity, I began to understand how to complete the activity."
1 2 3 4 5 6 7 8 9
Very Strongly Disagree — Neither Agree Nor Disagree — Very Strongly Agree

[GDST Forming/Task Dimension]

Q4) Rate the degree to which you agree or disagree with the following statement:
"At some point during this activity, I began to see how my group members would relate to one another in this specific activity."
1 2 3 4 5 6 7 8 9
Very Strongly Disagree Neither Agree Nor Disagree Very Strongly Agree

[GDST Forming/Relationship Dimension]

Q4 originally asked, "Rate the degree to which you agree or disagree with the following statement: 'At some point during this activity, I began the process of understanding who I was working with.' The pilot study revealed that this question confused participants. Participants reported that this question as confusing because their group had already worked together for two years. To begin the process of understanding team members whom they had already known for two years seemed confusing for participants. Instead, this question underwent rephrasing to probe for a new level of relational understanding which was directly connected to "Traffic Jam." The redesign used the words "in this specific activity" to place the focus of the question on Traffic Jam. With Q4, a great deal of thought went into selecting the words "relate to." The alternative option was "work with." "Relate to" intends to measure the relationship dynamics which took place in the initiative. If the words "work with" were chosen, perhaps they could indicate too much of the task dynamic in the first group developmental stage.

9.2.2 Storming

The second group developmental stage incorporated into questionnaire items is storming in both task and relationship dimensions. The first question of this pair aims to measure storming in the task dimension, and the second the relational dimension.

Q5) Rate the degree to which you agree or disagree with the following statement:
"For at least a moment during this activity, I experienced less desire to complete this activity."
1 2 3 4 5 6 7 8 9
Very Strongly Disagree Neither Agree Nor Disagree Very Strongly Agree

[GDST Storming/Task Dimension]

Q6) Rate the degree to which you agree or disagree with the following statement:
"For at least a moment during this activity, I experienced less desire to work with one or more individuals on my team."
1 2 3 4 5 6 7 8 9
Very Strongly Disagree — Neither Agree Nor Disagree — Very Strongly Agree

[GDST Storming/Relationship Dimension]

9.2.3 NORMING

The third group developmental stage intended for measurement is the norming stage in both the task and relationship dimensions. Q8 hopes to measure norming in the task dimension, and Q7 the relational dimension. Specifically, the task realm question employs Tuckman's description that "…in the third stage… in the task realm, intimate, personal opinions are expressed" (1965, p.396). This question will be developed to see if individuals were able to express their opinion about the task.

The order of Q7 and Q8 was originally switched in the pilot study. Upon further review of the questionnaire following the pilot study, Q7 actually appeared to measure a relationship dynamic due to the level of trust required to express an idea about an activity. Q8 better explored the task dimension of the norming phase because the word "work" is employed, emphasizing the task which the group is functioning to complete. This argument about the word "work"'s connection with task also drove the changes in Q4 on this questionnaire. This adjustment allows item eight to measure the task dimension of the norming stage and item seven to measure the relational dimension of the norming stage.

Q7) Rate the degree to which you agree or disagree with the following statement:
"At some point during this activity, I was able to share my ideas about how to complete the activity."
1 2 3 4 5 6 7 8 9
Very Strongly Disagree — Neither Agree Nor Disagree — Very Strongly Agree

[GDST Norming/Relationship Dimension]

Q8) Rate the degree to which you agree or disagree with the following statement:
"At some point during this activity, it seemed like my group improved in our ability to work together."
1 2 3 4 5 6 7 8 9
Very Strongly Disagree Neither Agree Nor Disagree Very Strongly Agree

[GDST Norming/Task Dimension]

9.2.4 PERFORMING

The fourth group developmental stage this research aims to measure is performing in both the task and relationship dimensions. The first question of this pair aims to measure performing in the task dimension, and the second the relational dimension. The first question includes Tuckman's guidance that "Roles become flexible and functional, and group energy is channelled into the task" (1965, p.396). The second question in this set takes into account Tuckman's notion that the "Structural issues [of the group] have been resolved, and structure can now become supportive of task performance" (1965, p.396). The question hopes to determine whether a particular group member saw such a cohesion which was completion-oriented develop within their own view of the group. These two questions should provide indicators about the participants' views of the performing stage in both task and relationship realms.

Q9) Rate the degree to which you agree or disagree with the following statement:
"At some point during this activity, I viewed my role within the group as doing whatever was needed to help complete the activity."
1 2 3 4 5 6 7 8 9
Very Strongly Disagree Neither Agree Nor Disagree Very Strongly Agree

[GDST Performing/Task Dimension]

Q9 originally asked, "Rate the degree to which you agree or disagree with the following statement: 'At some point during this activity, the majority of the group was working smoothly at completing the activity.'" This question was altered due to an analysis using Cronbach's alpha after the pilot study. Were this question removed, it would increase

the overall alpha score of the questionnaire (from α =.734 to α =.754). This trend proved to be consistent when the data from the pilot control and experimental groups were divided and analysed separately as well. Instead of completely removing the question, this design process adjusted the wording to make the question more specific.

Q10) Rate the degree to which you agree or disagree with the following statement:
"At some point during this activity, a point was reached where any disagreements about how to complete the task were settled."
1 2 3 4 5 6 7 8 9
Very Strongly Disagree — Neither Agree Nor Disagree — Very Strongly Agree

[GDST Performing/Relationship Dimension]

The initial form of Q10 caused problems in the questionnaire. Q10 demonstrated too much similarity to another question that did ultimately make it into the final version of the questionnaire. The omitted question asked participants to agree or disagree with this statement: "At some point during this activity, the majority of the group was working smoothly together." While differently worded, these questions were significantly correlated (r =0.630) when using the Pearson's r test: a test to showing the strength of a relationship between two variables (Field, 2018). Overly strong r scores across two items show that the questions are too similar. Overly similar questions should be adjusted to create some discrimination between them. In this case, Q10 received slight wording adjustment, and this development process completed removed a similarly worded question.

9.2.5 Adjourning

In light of Tuckman and Jensen additions to Tuckman's 1965 article, this questionnaire development includes the adjourning phase (1977). A critique of Tuckman and Jansen's work could be that the adjourning phase is not adequately couched within the task and relationship realms to continue thematically from Tuckman's 1965 article. Attarian and Priest offer more specific guidelines for the adjourning phase. In the task realm of adjourning, "The task is terminated, usually with feelings of separation anxiety. Members

may miss their work and have trouble coping with closure" (1994, pp.13-19). This description seems stronger than the expected experiences for groups in Traffic Jam. This questionnaire includes the important point that participants perceive a termination of the task. This termination must factor in success or failure. Regardless of outcome, task termination stands as the key indicator of the adjourning phase in the task dimension. The relational dimension in the adjourning phase happens when "…relationships are transformed, usually with feelings of satisfaction" but also sometimes with dissatisfaction and denial (1994, p. 13-19). If participants experienced the relationship dimension of adjourning, they should report satisfied or dissatisfied closure feelings about their teammates. This questionnaire aims to measure the task and relationship dimension of the adjourning phase to explore whether participants experienced this phase in both dimensions at any point.

Q11) Rate the degree to which you agree or disagree with the following statement:

"There was a point in this activity where I knew the activity was coming to a close, whether successful or not."

1	2	3	4	5	6	7	8	9
Very Strongly Disagree			Neither Agree Nor Disagree					Very Strongly Agree

[GDST Adjourning/Task Dimension]

Q12) Rate the degree to which you agree or disagree with the following statement:

"As a result of this activity, my attitude toward one or more people in my group has changed, for better or worse."

1	2	3	4	5	6	7	8	9
Very Strongly Disagree			Neither Agree Nor Disagree					Very Strongly Agree

[GDST Adjourning/Relationship Dimension]

Q11 did not require adjustment following pilot studies; however, Q12 required changes. Q12 originally read, "Rate the degree to which you agree or disagree with the following statement: 'As a result of this activity, my attitude toward one or more people in my group has changed.'" The words "for better or worse" were added after incorporating

feedback from participants in the pilot study. This change allowed participants to consider both positive and negative experiences in their responses.

Q12a) **If you're able, please explain your answer.**
_____
_____
_____

[Qualitative Question/Adjourning/Relationship Dimension]

Q12a is a qualitative item designed to request specific feedback about Q12a. Q12a explores whether participants felt like they learned new information about their fellow participants during "Traffic Jam." Q12a asks for a qualitative elaboration on Q12, probing for a worded response explaining the attitude shift toward others in the group. The original wording of the question was, "If you're able, please write a description of your attitude change toward someone in your group and what caused this change." Out of 11 pilot respondents, four gave responses to Q12a. Three of those respondents indicated that this question was not applicable. Therefore, this design process reworded Q12a to ask for a broader elaboration on Q12 in hopes of eliciting more quality responses.

9.2.6 Task vs Relationship

After offering those 11 questions to participants to measure the task and relationship dimension within each group developmental stage, the questionnaire offers two general questionnaire items to explore the broader task and relationship experiences of participants. These two questions attempt to mitigate any distortion induced by the five stages when measuring the two dimensions. Q13 intends to measure the presence of the relational dimension during the activity while Q14 measures the presence of the task dimension. These questions explore whether there were different times when a participant valued primarily the task or primarily the relationship realms.

Q13) Rate the degree to which you agree or disagree with the following statement: 'At some point during this activity, the people I was working with seemed like my top priority.								
1	2	3	4	5	6	7	8	9
Very Strongly Disagree			Neither Agree Nor Disagree					Very Strongly Agree

[Relationship Dimension]

Q13 intends to measure the presence of the relational dimension during the activity. When relationships with other group members take priority over the activity itself, a participant enters the relational dimension.

Q14) Rate the degree to which you agree or disagree with the following statement: **"At some point during this activity, solving the problem seemed more important than getting along with everyone."**								
1	2	3	4	5	6	7	8	9
Very Strongly Disagree			Neither Agree Nor Disagree					Very Strongly Agree

[Task Dimension]

This design process adjusted Q14 following the pilot study. It originally read, "Rate the degree to which you agree or disagree with the following statement: 'At some point during this activity, achieving the goal seemed like my top priority.'" This research decided to reword Q14 with the expectation that more precise, specifically worded questions better measure variables. The distinction introduced through the new format shows a comparison between task and relationship.

9.2.7 GDST Conclusion

Q3 through Q14 should generate data that indicates whether participants in the experiment experienced any of the five developmental stages in both task and relationship realms (Jensen, 1965; Tuckman and Jensen, 1977; Attarian and Priest, 1994). These measures should help describe the experiences of participants in Traffic Jam in light of Group Developmental Stages Theory with task and relationship dimensions in quantitative and qualitative ways.

9.3 Flow Theory

The second major theory included in the questionnaire is Flow Theory. Flow is the optimal performance that an individual or group (this research focuses on the group) can achieve. Flow has seven reciprocal "anti-flow" states. These eight states (One flow state and seven anti-flow states) are called "channels" within flow research (Massimini and Carli, 1988). This research design calls those seven non-flow channels "anti-flow" because they are not the flow process. These seven psychological states of anti-flow are control, relaxation, boredom, apathy, worry, anxiety, and emotional arousal (1988). This questionnaire incorporates the seven anti-flow channels and the flow channel into its design. The questionnaire integrates all eight channels into questions by adapting existing instruments to explore how participants see their anti-flow or flow experiences within the group.

Flow research usually uses the experience sampling method (ESM) to measure flow. This method was first introduced in 1977 and has been adapted and reused in a variety of cultures and contexts (Csikszentmihalyi, Larson, and Prescott, 1977; Larson and Csikszentmihalyi, 1983; Csikszentmihalyi and Larson, 1987; Carli, Fave, and Massimini, 1988; Waterman, Schwartz, Goldbacher, Green, Miller, and Philip, 2003; Bonaiuto *et al.*, 2016). This method samples populations over a period of time usually longer than a week. This research adopts a slightly adapted ESM since the experiment associated with this designed research only happens over approximately two to three hours. The ESM questions were adapted into a set of post-test questions to measure participants' flow or anti-flow experiences in Traffic Jam. The ESM was originally designed to "… [overcome] some of the constraints of other methods by combining the ecological validity of field methods with a variety of measurement techniques" (Kubey, Larson, and Csikszentmihalyi,1996, p.100). Using an immediate post-test ESM upholds the ESM's spirit of the sampling in the moment, as the ESM itself also measures flow channel experiences immediately following an activity

(1996). A critique of this research project is that it only takes a single set of responses in a post-test questionnaire, while the ESM is usually used to collect multiple sets of responses over a period of a week or more. Ultimately, Hektner, Schmidt, and Csikszentmihalyi (2007) say that the "… ESM has been left unstructured to encourage researchers to use it for their own purposes" (p.43) leaving it up to the researcher to understand and apply the ESM. Therefore, this research uses a single-shot post-test set of questions that are similar to those on the ESM to explore the anti-flow and flow experiences of participants in Traffic Jam.

9.3.1 Challenge vs Skill Level

Q15) **Overall, how challenging did the activity feel in which you participated today?**

1 2 3 4 5 6 7 8 9

Not Challenging at All Very Challenging

[Flow/Challenge Level]

Q16) **Overall, how skilled were you at this activity?**

1 2 3 4 5 6 7 8 9

Not Skilled at All Very Skilled

[Flow/Skill Level]

The first two flow-related questions intend to measure a participant's perceived challenge level in Traffic Jam versus their perceived skill level. A key concept for Flow Theory queries upon a person's perceived skill level in relation to their perceived challenge level of the activity (Csikszentmihalyi, 2000; Massimini and Carli, 1988). Depending on how these two variables relate indicates which flow or anti-flow channel an individual operated within (Massimini and Carli, 1988). Massimini and Carli say that "…theoretically, the most meaningful reference point for the presence or absence of flow is the perception of challenges and skills reported on the ESM sheets" (1988, p.296). In their 1988 study, Massimini and Carli used nine-point scales to measure challenge level versus skill level in participants. This research employed the nine-point format across all of its questions to reduce possible

confusion amongst participants with varying scales. Massimini and Carli used questions from Larson and Csikszentmihalyi's 1983 study.[3] Q15 and Q16 explore the perceived challenge and skill levels of participants in Traffic Jam.

Measuring challenge against skill level intends to explore which of the eight channels a participant *generally* experienced throughout Traffic Jam. This research only changed the ESM questions by adding the word, "overall." This research added "overall" to the original wording of the ESM questions in an attempt to explore participants' general impression of the entire experience rather than just one particular moment.

9.3.2 The Eight Conditions of Flow

Challenge and skill level ratios should offer insight into participants' flow experiences, but there are additional questions which allow verification of a flow experience. These additional questions measure eight conditions required to achieve a flow-state and have remained consistent throughout the decades since flow's introduction (1975/2000) (e.g. Massimini and Carli, 1988; Waterman *et al.*, 2003). The questionnaire uses Waterman *et al.*'s proposed list of questions that measure the eight conditions required for flow.

Here is their instrument that this research adopts into its questionnaire:

> *Flow experiences*. Flow was measured using an eight-item scale, the items corresponding to elements identified by Csikszentmihalyi (1990). The items were phrased as completions of a common stem: "When I engage in this activity ____." The item completions for this scale were the following: (a) I feel I have clear goals, (b) I feel self-conscious (reverse scored), (c) I feel in control, (d) I lose track of time, (e) I feel I know how well I am doing, (f) I have a high level of concentration, (g) I

[3] A more legible, though lengthened version was used to match questions to the original set proposed by Larson and Csikszentmihalyi (1983) is offered by Hektner *et al.* (2007).

> forget personal problems, and (h) I feel fully involved. These items were embedded among a series of other sentence completions not specific to flow experiences. Each item was responded to on a scale ranging from *not at all characteris- tic of me* to *very characteristic of me*. (Waterman *et al.*, 2003, p.1452)

This design process adjusted the wording of Q17 through Q24 from Waterman *et al.*'s phrasing in order to probe for the specific experiences participants had while working on Traffic Jam.

Q17) **While engaged in the activity I felt I had clear goals.**

1	2	3	4	5	6	7	8	9
Very Strongly Disagree				Neither Agree Nor Disagree				Very Strongly Agree

[Flow/Clear Goals]

Q18) **While engaged in the activity I felt self-conscious.**

1	2	3	4	5	6	7	8	9
Very Strongly Disagree				Neither Agree Nor Disagree				Very Strongly Agree

[Flow/Self-Conscious]

Q19) **While engaged in the activity I felt in control.**

1	2	3	4	5	6	7	8	9
Very Strongly Disagree				Neither Agree Nor Disagree				Very Strongly Agree

[Flow/Felt Control]

Q20) **While engaged in the activity I lost track of time.**

1	2	3	4	5	6	7	8	9
Very Strongly Disagree				Neither Agree Nor Disagree				Very Strongly Agree

[Flow/Temporal Distortion]

Q21) **While engaged in the activity I knew how well I was doing.**

1	2	3	4	5	6	7	8	9
Very Strongly Disagree				Neither Agree Nor Disagree				Very Strongly Agree

[Flow/Feedback]

Q22) **While engaged in the activity I had a high level of concentration.**								
1	2	3	4	5	6	7	8	9
Very Strongly Disagree			Neither Agree Nor Disagree					Very Strongly Agree

[Flow/Concentration]

Q23) **While engaged in the activity I forgot personal problems.**								
1	2	3	4	5	6	7	8	9
Very Strongly Disagree			Neither Agree Nor Disagree					Very Strongly Agree

[Flow/Forgot Personal Problems]

Q24) **While engaged in the activity I felt fully involved.**								
1	2	3	4	5	6	7	8	9
Very Strongly Disagree			Neither Agree Nor Disagree					Very Strongly Agree

[Flow/Involvement]

9.3.3 Flow Conclusion

This section described the questionnaire items from Flow Theory research that this research incorporated into its questionnaire design. Q15-Q24 make up a ten-question set that intends to explore participants' experiences of anti-flow or flow using previously tested questionnaire items. Q15 and Q16 measure challenge against skill level for each participant while Q17 through Q24 measure each participants' experience of the eight conditions required for individual flow.

9.4 Liminoid Theory

Arnold van Gennep originally observed liminality and liminoid concepts through ethnographic methods (van Gennep, 1960). This research plans to adapt the theoretical underpinnings of Liminoid Theory into quantitative and qualitative questionnaire items in order to determine whether participants experienced the liminoid space during Traffic Jam. Liminoid experiences could prove difficult to measure because they are spontaneous, similar to flow experiences. This research reasons that if the ESM can measure flow, it should also be possible to measure liminoid experiences in situ. This section sets out to develop

questionnaire items to explore participants' experiences of liminoid space within the Traffic Jam activity.

Theoretical elements of liminoid states are incorporated into questions to measure participants experiences of the liminoid space. A key set of liminoid concepts that influence this questionnaire are the tripartite stages of liminality (i.e. pre-liminal, liminal, and post-liminal). Van Gennep originally offered in terms of liminality and not the liminoid:

> Consequently, I propose to call the rites of separation from a previous world, preliminal rites, those executed during the transitional stage liminal (or threshold) rites, and the ceremonies of incorporation into the new world postliminal rites. (van Gennep, 1960/1906, p.42)

These three phases: separation, transition, and incorporation, were the key concepts for van Gennep, the transitional phrase coined as the "liminal" phase (Thomassen, 2014). Turner called the three phases pre-liminal, liminal, and post-liminal (1974). The literature review discusses the differences between liminality and the liminoid, so this questionnaire development focuses on the three phases being introduced into the questionnaire. Each phase of liminoid has unique characteristics that will form the basis of the structure on which to build liminoid questionnaire items.

Another major, liminoid concept woven into all of the liminoid questionnaire items is communitas. Communitas was a concept developed by Victor Turner in his ethnographic research (1969, 1974). Turner presented three types of communitas: spontaneous communitas, ideological communitas, and normative communitas. Spontaneous communitas is a cohesion that spontaneously occurs amongst a group of people while they are together through a liminoid experience. Victor Turner considered spontaneous communitas as occurring outside of normal structures of society. He categorized spontaneous communitas as “anti-structural.” The following questionnaire items intend to measure how participants

viewed their group during Traffic Jam, but it also intends to measure how the group experience in Traffic Jam influenced participants' thoughts about future groups. Theoretically, spontaneous communitas should influence a participant's opinion about the Traffic Jam group and future groups. Ideally, the MLGLS describes how spontaneous communitas occurs in Traffic Jam, hoping to provide future facilitators with a guide that allows them to foster opportunities for their own groups to experience this sense of community.

9.4.1 Pre-Liminoid

According to van Gennep, separation from the structure of daily activity characterized the pre-liminoid phase. The pre-liminoid phase is the precursor to the anti-structural liminoid transition phase. The pre-liminoid phase offers a feeling of leading up toward the liminoid space and leading out of normal communal structures. For this experiment, pre-liminoid occurs when participants arrive and begin to step out of their daily routines of activity in order to engage in an experimental Traffic Jam activity. As participants temporarily shed the structure of daily life and roles, a new anti-structure develops in an environment which is set-up to foster liminoid communitas (Turner, 1974). This questionnaire development determined that two concepts needed measurement to explore the pre-liminoid phase. The first concept is forgetting daily responsibilities. The second concept is forgetting social roles that pre-exist within a group.

Q25) **At some point during the activity, I began to think less about my daily concerns.**								
1	2	3	4	5	6	7	8	9
Very Strongly Disagree			Neither Agree Nor Disagree					Very Strongly Agree

[Pre-Liminoid/Forgetting Daily Concerns]

Q25 aims to measure the experience of forgetting daily responsibilities. Q25 shares some conceptual similarity with flow-related questions Q20 and Q23 on the questionnaire because all three items explore participants experiences as they lose focus on their daily

concerns. They are all three retained for exploration in the experiment because they are differently worded. Additionally, this design process developed Q24 as a new question while Q20 and Q23 come from the ESM, so it will retain Q24. The pre-liminoid phase explores the beginnings of loss of personal concerns. Personal concerns fall to the wayside in favour of the task and group immediately at hand during the liminoid space.

Q26) **At some point during the activity, I began to notice others were uncertain about how to interact with each other.**								
1	2	3	4	5	6	7	8	9
Very Strongly Disagree			Neither Agree Nor Disagree					Very Strongly Agree

[Pre-Liminoid/Relational Uncertainty]

The second pre-liminoid concept included in questionnaire development explores whether a participant started to forget the structure of normal social roles. In a pre-liminoid state, culturally structured role boundaries come into flux. Q26 seeks to measure the degree to which participants experienced this pre-liminoid phenomenon where normal structures of relational interaction change.

Q26a) **If you're able, please write what happened in your group to make it clear that others were uncertain about how to interact with each other. If you disagree, please explain why.**

_____

_____

_____

[Qualitative Question/Pre-Liminoid/Relational Uncertainty]

Q26a is the qualitative follow-up question to Q26. Q26a required some adjustment following the pilot study. Q26a was reworded from "If you're able, please write what happened in your group to make it clear that others were uncertain about how to interact with each other." Pilot study participants indicated that sometimes the open-ended questions did not make provisions for some answers. The new form includes a clause that allows for disagreement with the proposed questionnaire item, broadening the range of possible responses.

9.4.2 Mid-Liminoid

This research incorporated mid-liminoid phase concepts into questionnaire items. The liminoid phase carries a transitional sense. The classic Turnerian phrase the "betwixt-and-between" (1969, p.97) describes the liminoid state: a threshold state of limbo between one stage and another. Turner notes that the liminoid phase begins as pre-liminoid characteristics begin to come to a close, but this closing is more like a blooming: where the characteristics of pre-liminoid become fully apparent. Turner says about the liminoid phase: "... signs of their preliminal status are destroyed and signs of their liminal non-status are applied" (1974, p.59). By this phrase, he means that structures of everyday life dissolve and a new communitas forms (Turner, 1969) that bonds together through a shared experience.

If participants undergo a liminoid experience, theoretically they should report sensations such as uncertainty about how to move forward, feeling stuck, feeling like success is nowhere in sight. This assumption about uncertain and stuck sensations comes from the "betwixt and between" idea associated with the liminoid space. The "betwixt and between" signifies that a beginning took place (pre-liminoid), but the end of an experience remains out of reach because completion requirements have yet been reached (post-liminoid). From personal, anecdotal experience from this researcher many students in liminoid learning situations express feeling "stuck." In short, they know they're in a difficult experience, but they are unsure how to progress out of it. These students were describing that feeling of being between two states: "betwixt-and-between." After discussion with colleagues and teaching assistants who have helped this researcher facilitate liminoid learning experiences, the word "stall" seems to best communicate in layman's terms that betwixt-and-between feeling.

Two mid-liminoid concepts measured in this questionnaire are the transitionary stall sensation and a new cohesion with the people in the current group (communitas).

Transitionary stall is measured on Q27 and Q27a while different elements of mid-liminoid communitas are explored using Q28 through Q31a.

Q27) **At some point during the activity, our group progress stalled.**

1	2	3	4	5	6	7	8	9
Very Strongly Disagree			Neither Agree Nor Disagree					Very Strongly Agree

[Mid-Liminoid/Stall]

Q27a) **If you're able, please write what happened in your group that made it clear you were stalling.**

_____

_____

_____

[Qualitative Question/Mid-Liminoid/Stall]

Q28) **At some point during the activity, I felt like most members of the group were working together, for better or worse.**

1	2	3	4	5	6	7	8	9
Very Strongly Disagree			Neither Agree Nor Disagree					Very Strongly Agree

[Mid-Liminoid/Post-Structural Interwork]

Q28 aims to measure whether participants experienced the liminoid phase based upon the liminoid concept that daily responsibilities and concerns seem forgotten in light of the liminoid experience. When a participant focuses on the group at hand and forgets their daily responsibilities, they ably come together in communitas and co-work. This particular aspect of the liminoid phase is what originally inspired this researcher to see a connection between liminality and Flow Theory even before reading Turner's 1974 article and seeing that Victor Turner himself had made a similar connection.

This question includes the words "for better or worse" to avoid confusion about the notions of connectedness and success. A connection can develop during a struggle even when success does not seem imminent. Q28 explores whether participants experienced a coworking, focused communitas.

Q29) **As a result of this activity, I feel like I learned something about some or all members of the group.**								
1	2	3	4	5	6	7	8	9
Very Strongly Disagree			Neither Agree Nor Disagree					Very Strongly Agree

[Mid-Liminoid/Relational Learning]

Q29 measures the development of liminoid communitas as indicated by learning about others in that communitas. Q29 needed adjustment from its original wording. It originally read, "As a result of this activity, I feel like I know some or all members of the group better than I did at the beginning." In the pilot study, the original phrasing confused participants who had already known each other for two years. The new phrasing of this question helps groups who are meeting for the first time and groups who have been together for a longer period to see the question similarly. Rewording Q29 should clarify confusion that could arise due to a group's pre-existing time together or lack thereof. Instead, emphasis is placed on learning about teammates due specifically to "Traffic Jam."

Q29a) **If you're able, please share something(s) you learned about a member or members of your group.**

_____

_____

_____

[Qualitative Question/Mid-Liminoid/Relational Learning]

Q29a qualitatively explores the experience of participants with respect to the other members of the group. This question hopes to discover whether participants felt as though they learned anything about their group members. Hopefully, group members who have previous relationships will report learning about each other in this novel activity.

Q30) **Rate the degree to which you agree or disagree with the following statement: "I shared my ideas about how to accomplish the task with the group."**								
1	2	3	4	5	6	7	8	9
Very Strongly Disagree			Neither Agree Nor Disagree					Very Strongly Agree

[Mid-Liminoid/Relational Sharing Risk]

Another element of the liminoid space incorporated into this questionnaire design is perceived risk. Perceived risk in this study does not refer to uncontrolled risk like in liminal

gambling (Thomassen, 2014). Instead, the perceived risk in this questionnaire speaks to managed risk, such as those encountered when facilitating outdoor learning experiences. Risk serves as a managed resource to enhance learning experiences for outdoor facilitators. Risk can be physical, but it can also be emotional, social, and financial according to Priest and Gass (2018/2005).

This experiment intends to measure relational risk, because such risk associates with liminoid communitas. Risk in the relational dimension should naturally occur as participants step forward in vulnerability to offer their ideas about how to accomplish the task. Their ideas will be received favourably or unfavourably by the group. Risk in a group can be idiomatically described as "putting oneself out there." Risk in a group setting is called vulnerability: presenting one's ideas, opinions, or feelings about a topic, not knowing how the group will respond. This type of risk is how individuals will push themselves and their group closer to or further from communitas and eventually a post-liminoid experience. So, if a person's willingness to be vulnerable describes whether they were willing to take a social risk within the group, then a question about vulnerability will be used as a measure of risk taken within the initiative. Q30 and Q31 intend to measure the relational risk that indicates liminoid communitas. Q30 explores whether a person was willing to contribute their ideas to the group. Q31 explores how vulnerable a participant was and how much risk it took to share those ideas. Offering these two questions restricts errors of assuming every shared idea took vulnerability or that anyone who did not share did so because they were worried about the group's response.

Q31) **At some point during this activity, whether I shared or not, I was uncertain how others in the group would respond to me.**								
1	2	3	4	5	6	7	8	9
Very Strongly Disagree			Neither Agree Nor Disagree					Very Strongly Agree

[Mid-Liminoid/Relational Sharing Fear]

Q31a) **If you are able, please share any factors that caused you to feel uncertain about how others would respond to you. If you felt no uncertainty, please explain why.**

_____

_____

_____

[Qualitative Question/Mid-Liminoid/Relational Sharing Fear]

9.4.3 Post-Liminoid and CDTT

This appendix presents Post-Liminality and parts of Co-Constructed Developmental Teaching Theory together because they share conceptual overlap. This research developed Q32 through Q34a using post-liminoid concepts, but later discovered conceptual similarities between post-liminoid and the bridge-building and assimilation phases of CDTT. So Q32 through Q34a show conceptual grounding in both post-liminoid and CDTT. Post-liminoid phase, CDTT bridge-building, and CDTT assimilation share this element where lessons learned from an experience influence a participant. Participants take lessons learned in an activity and apply those lessons into future scenarios. Turner described this transition as the transition from anti-structural, liminoid communitas back into the post-liminoid structure of daily life. In CDTT terminology, a participant learns lessons experientially in an activity then incorporates those lessons into their personal paradigms through bridge-building and assimilation.

Reincorporation marks the post-liminoid phase. Arnold van Gennep said that post-liminal rights are marked by "…ceremonies of incorporation into the new world" (1960/1906, p.43). With post-liminality, a person gains a new cultural status. This research intends for no new cultural status, but instead aims to explore post-liminoid reflection. All participants who undergo a liminoid experience might theoretically leave that experience with new conclusions about how to interact with subsequent groups and communities. Using van Gennep's term of reincorporation with Turner's concepts of structure, the question those who pass through the liminoid may ask is: "How do I take what has happened in the liminoid space and reincorporate it into the structure of my everyday life as I work with others?" The

following questions seek to measure the extent to which participants in this experiment experience such a sentiment.

Q32) Rate the degree to which you agree or disagree with the following statement:

Something happened in this activity that caused me to think about how I treat others.

1 2 3 4 5 6 7 8 9

Very Strongly Disagree Neither Agree Nor Disagree Very Strongly Agree

[Post-Liminoid/Relational Learning/CDTT Bridge-Building]

Q32a) **Please describe anything that happened during this activity that caused you to think about how you treat others. If possible, please explain your answer.**

_____

_____

_____

[Qualitative Question/Post-Liminoid/ Relational Learning/CDTT Bridge-Building]

Q32a was adjusted from its original format to take in suggestions from pilot study participants. They suggested that this question should allow for both agreement and disagreement options. The original format of question 32a was "If you're able, please share any factors that caused you to feel uncertain about how others would respond to you." The new format includes a clause for certainty or sureness in a person's actions. This question was not changed to, "Please explain your answer." Because the pilot responses to the original format were qualitatively rich. To remove the original form of the question could jeopardize the opportunity to gather qualitatively rich data.

Q33) **Rate the degree to which you agree or disagree with the following statement:**

Something happened during this activity that caused me to think about how others treat me.

1 2 3 4 5 6 7 8 9

Very Strongly Disagree Neither Agree Nor Disagree Very Strongly Agree

[Post-Liminoid/Relational Learning/CDTT Bridge-Building]

Q33a) **Please describe anything that happened during this activity that caused you to reconsider how others treat you. If possible, please explain your answer.**

_____

_____

_____

[Qualitative Question/Post-Liminoid/Relational Learning/CDTT Bridge-Building]

Q34) Rate the degree to which you agree or disagree with the following statement:

Having finished this activity, I found myself considering how I would work with future groups of people differently than before.

1	2	3	4	5	6	7	8	9
Very Strongly Disagree				Neither Agree Nor Disagree				Very Strongly Agree

[Post-Liminoid/Relational Learning/CDTT Assimilation]

Q34's original phrasing said, "If possible, please describe any actions you would or would not take in future groups as a result of today's activity." This questionnaire adjusted Q34 simply to provide clarity.

Q34a) **If possible, please describe anything you learned as a result of today's activity that made you desire to adjust your own actions in future groups.**

_____

_____

_____

[Qualitative Question/Post-Liminoid/Relational Learning/CDTT Assimilation]

9.4.4 Liminoid Conclusion

This concludes the section of this questionnaire which intends to measure whether participants passed through a liminoid threshold experience in this designed research. Q26 through Q34a aim to explore if participants experience liminoid phases in Traffic Jam. This research developed these novel questions using the founding theories of Arnold van Gennep and Victor Turner. Theories used in designing these questions include liminoid and communitas with associated risk and vulnerability. Used in a post-test setting immediately following the Traffic Jam activity, they should indicate whether pre-liminoid, liminoid, and post-liminoid phases were passed through.

9.6 CDTT

Co-Constructed Developmental Teaching Theory (CDTT) is a new experiential education theory based in neuroscience. Modulated Liminoid Group Learning Synthesis includes CDTT theory, so this research intends to measure CDTT phases. The six phases of CDTT are framing, activity, direct debrief, pause, bridge-building, assimilation, and person. One of the major strengths of this theory is that it grounds learning holistically into personhood (Schenck and Cruickshank, 2015). This questionnaire design intends to measure the degree to which participants experience the six stations in the CDTT.

9.6.1 Framing

The first station of framing occurs naturally. Schenck and Cruickshank suggest that the facilitator's role is to actively participate especially in the framing, activity, and direct debrief. Suggesting that a facilitator *take part* in the framing process indicates that it is an already occurring phenomenon within a person's experience; the facilitator is not the sole contributor to framing in an experiential learning environment.

All individuals have preconceptions about an experience prior to its occurrence: this is their personal frame. According to CDTT, the facilitator assists the learner by suggesting additional frames for an activity to their students. This questionnaire intends to measure both self-framing and facilitator-assisted framing to explore whether participants in the experiment are passing through this phase of the CDTT cycle. Q35 should measure self-framing while Q36 should measure facilitator-offered framing.

Q35) Rate the degree to which you agree or disagree with the following statement:
At the beginning of this activity, I already had thoughts about what would happen during the initiative.
1 2 3 4 5 6 7 8 9
Very Strongly Disagree — Neither Agree Nor Disagree — Very Strongly Agree

[CDTT Framing/Personal Presuppositions]

Q36) Rate the degree to which you agree or disagree with the following statement: **At the beginning of this activity, the facilitator explained what was about to happen during the initiative.** 1 2 3 4 5 6 7 8 9 Very Strongly Disagree Neither Agree Nor Disagree Very Strongly Agree

[CDTT Framing/Facilitator Input]

9.6.2 Activity

The activity phase of Co-Constructed Developmental Teaching Theory happens in an activity "…with short, clear, attainable goals, rapid natural feedback and within the range of the student's abilities, which facilitates motivation" They also emphasize "… getting the challenge level just right…" in an activity (2015). Traffic Jam is introduced to participants as an appropriately challenging activity. Schenck and Cruickshank also emphasize salience in an experiential learning activity: if a participant does not see the importance of an activity, they will not focus on it and learn from it. Traffic Jam takes place with others from pre-existing teams, hoping that participants will find salience in Traffic Jam due to expectations from their group. To actually measure whether participants felt they were in an activity seems redundant. To participate is to experience the activity, so this questionnaire development process chose not to add to the questionnaire by asking a self-evident question.

9.6.3 Direct Debrief

The third phase in CDTT is direct debrief. In Schenck and Cruickshank's article, direct debrief takes place following an activity and is specifically facilitator-led. This questionnaire development process conceives that direct debrief could also happen during an activity. Direct debriefs which occur during an activity are sometimes referred to as "teachable moments." This questionnaire design proposes that a break in the action of the activity could happen. This break would leave space for internal process or external discussion to take place. In such a discussion, a debrief could allow processing of immediately preceding events resulting in the group deciding to move forward on a different

trajectory. Participants might also debrief amongst themselves through introspection and peer interaction.

Importantly, direct debriefing relates directly to the framing objectives or questions (Schenck and Cruickshank, 2015). Some may think of a debrief as encompassing all aspects of a post-activity process discussion. Once a discussion moves to the topic of relating an activity with participants' prior life experiences, the group has moved on to bridge-building. Direct debriefing must pertain to the framing aspect.

With these points in mind, the proposed questions measuring whether participants experienced a direct debrief was "Rate the degree to which you agree or disagree with the following statement: The activity went differently than I expected." The pilot study showed that this question produced a lower reliability score in the questionnaire itself and upon reflection does not measure whether a debriefing took place. If a debrief has more to do with the opportunity to interact with a facilitator and gather new information, then the question could be better phrased. Here is the new phrasing of the item intended to measure debrief:

Q37) Rate the degree to which you agree or disagree with the following statement:
I was able to ask questions of myself, my teammates, or the facilitator in order to understand what was happening in the activity.
1 2 3 4 5 6 7 8 9
Very Strongly Disagree Neither Agree Nor Disagree Very Strongly Agree

[CDTT Direct Debrief]

9.6.4 PAUSE

Following the direct debrief, a pause is the next phase in Co-constructed Developmental Teaching Theory. Pause takes place as students or participants make space to allow the brain to process what has happened. In Schenk and Cruickshank's research, the amount of time a pause should take remains uncertain, though it can be as little as a few moments (2015). When the pause should take place and for how long remain possible areas of further research related to the Schenck and Cruickshank article.

This questionnaire development process could not conceive of a question to measure pausing due to its nature. Since a pause could last for seconds or for weeks, it seemed unlikely that one or two questions on this questionnaire could measure that construct. The pause would also prove difficult to measure

because it may happen unconsciously for participants, thus making it very difficult for a participant to report on a survey item. Unfortunately, the pause phase of CDTT seemed too difficult to capture on a questionnaire, so it was left out in hopes that it might be observed through other data collection means.

9.6.5 Bridge-Building

Bridge-building is the process that takes place as a participant relates the debriefed experience beyond the activity's framing into the context of their prior experiences. This research views such a phenomenon as an opportunity which the facilitator can intervene to assist in learning, but also as a naturally occurring part of the learning process. This project agrees with Schenck and Cruickshank's appraisal that this step is the most difficult (2015). It seems as though bridge-building is also difficult to measure because bridge-building can occur immediately following activity or long after it. Q32, Q32a, Q33, Q33a, Q38, and Q38a all attempt to measure whether participants took lessons learned through Traffic Jam and thought about applying them to other situations.

Q38) Rate the degree to which you agree or disagree with the following statement:

I saw some connection between this group activity and other group activities in which I have participated in the past.

1	2	3	4	5	6	7	8	9
Very Strongly Disagree			Neither Agree Nor Disagree					Very Strongly Agree

[CDTT Bridge-Building]

Q38a) **If possible, please, explain your answer.**

_____

_____

_____

[CDTT Bridge-Building]

9.6.6 Assimilation

The Assimilation phase happens when the transference process is finalised and assumed into a person's mode of operation (Schenck and Cruickshank, 2015). Assimilation and transference is the end goal of all learning, liminoid learning included. This research aims to explore whether participants experienced any assimilation during or immediately following Traffic Jam using Q34, Q34a. These questions may collect strong changes someone made to their person as a result of participating in Traffic Jam, but if these questions yield weak responses then it can be assumed that measuring assimilation would require different questions. Questions that explore experienced assimilations may need to be offered to participants days or weeks following an activity instead of in the immediate hour after it.

9.6.7 CDTT Conclusion

This study and the associated questionnaire design aim to explore whether participants experienced the Co-Constructed Developmental Teaching Theory phases during Traffic Jam. In Schenck and Cruickshank's pivotal article for experiential education, they make a call for empirical research of CDTT. This research design aims to do that in an exploratory manner. This research explores participants' experiences of CDTT using both quantitative and qualitative questions.

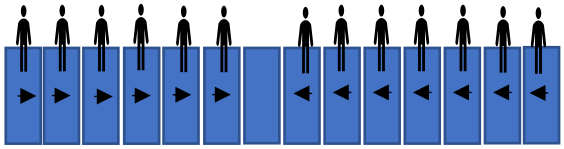
9.7 Questionnaire Design Conclusion

Group Developmental Stages Theory, Flow Theory, Liminoid Theory, and Co-Constructed Developmental Teaching Theory all influenced the design of this questionnaire. Three piloting measures were used to develop the questionnaire, which this research then employed in a full-fledged experiment. The resulting variables and data from this questionnaire reported in this findings chapter show that this questionnaire required much improvement from the form offered in this appendix. This research presents this appendix of questionnaire design to demonstrate a document trail of development to aid future researchers

who might use similar questions or who might attempt to group questions from multiple theories.

10. Appendix D: Traffic Jam Solution

Step 1



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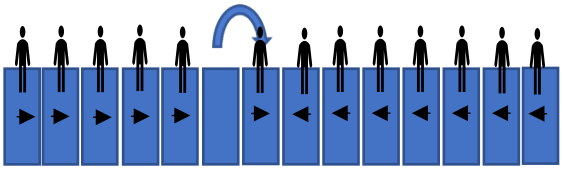

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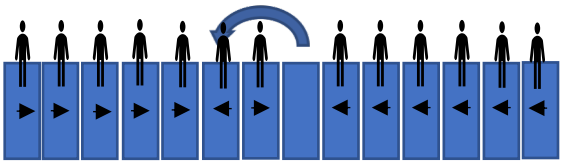

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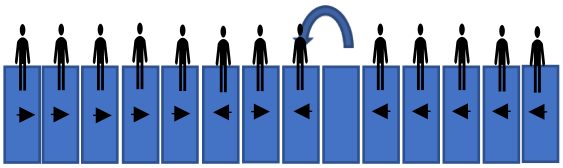

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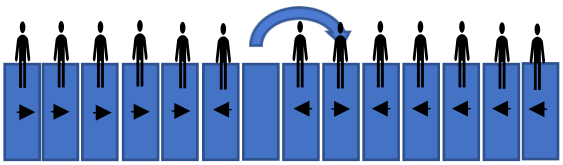

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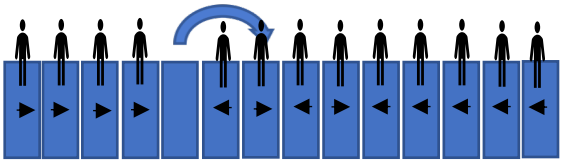

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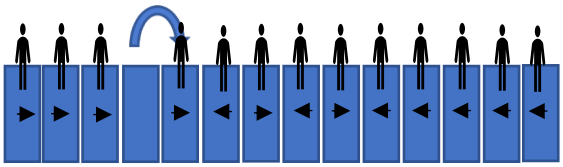

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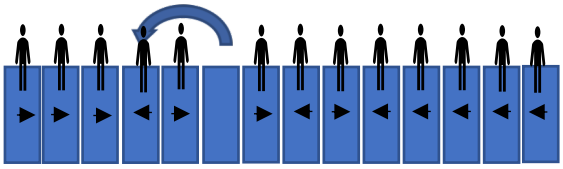

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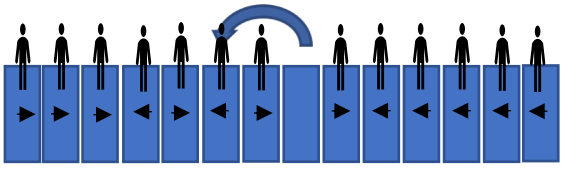

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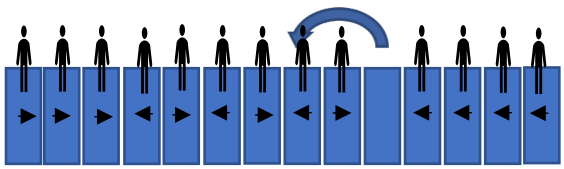

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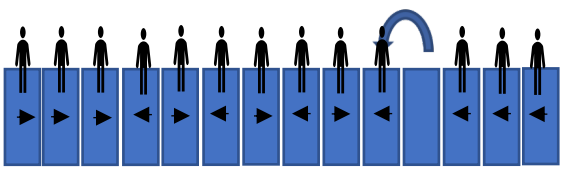

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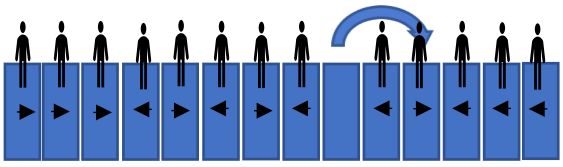

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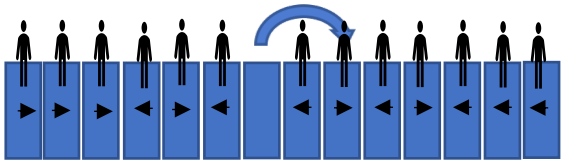

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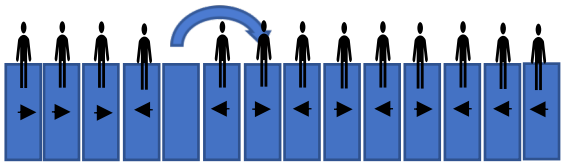

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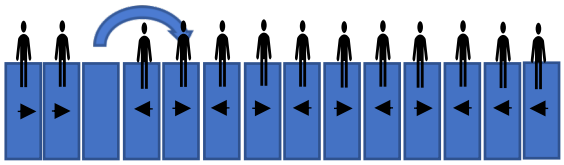

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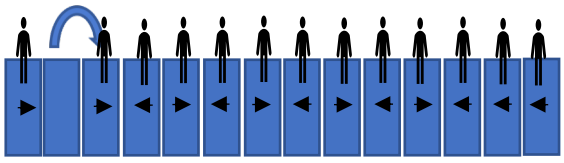

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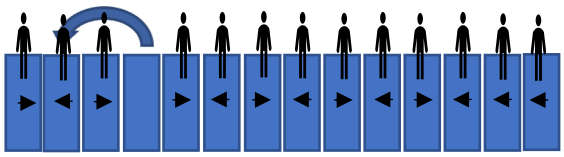

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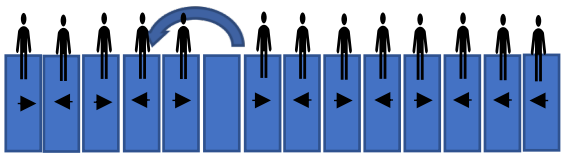

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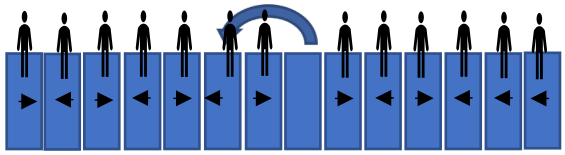

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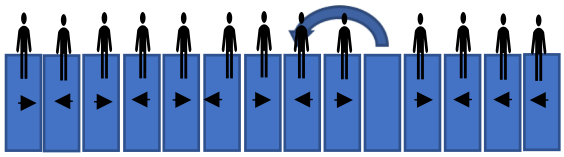

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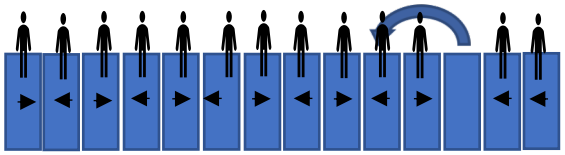

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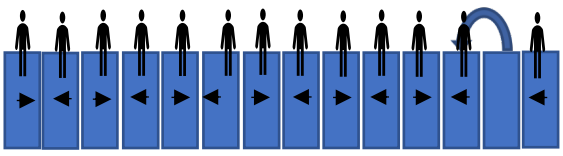

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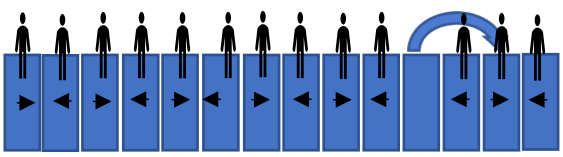

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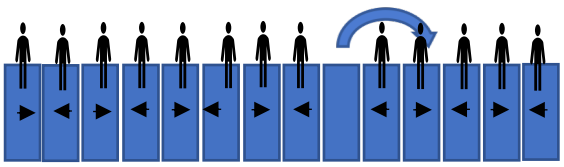

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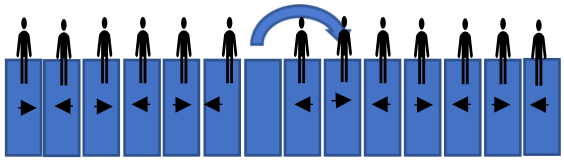

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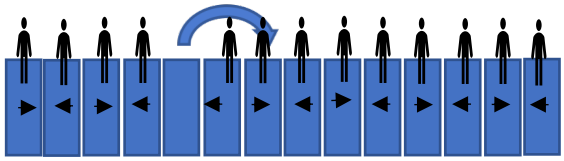

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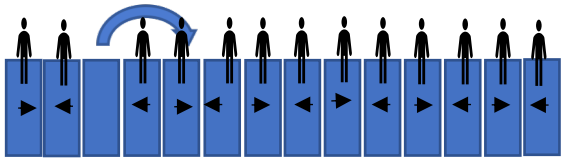

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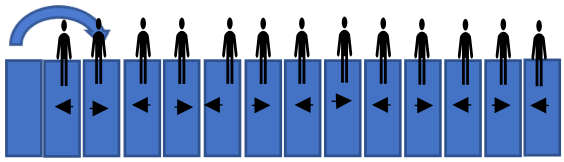

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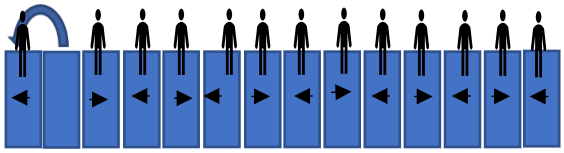

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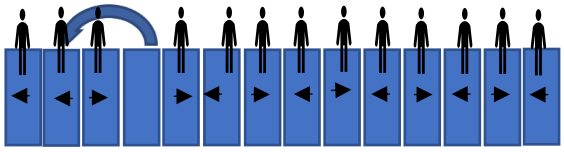

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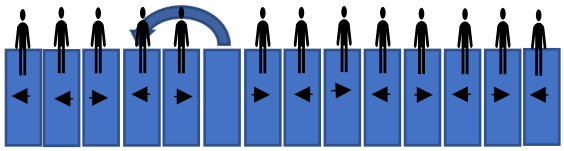

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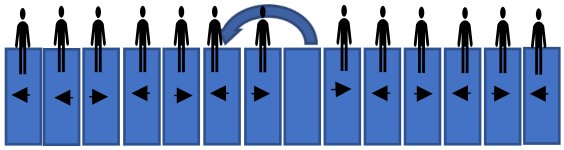

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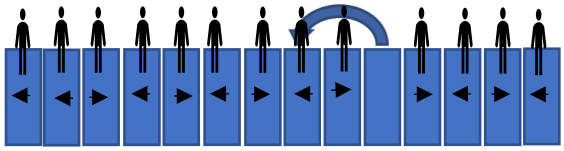

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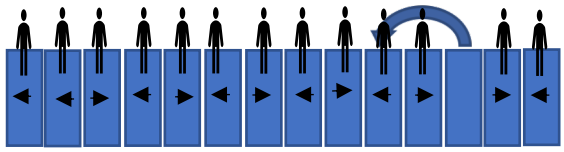

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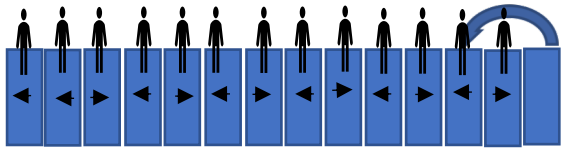

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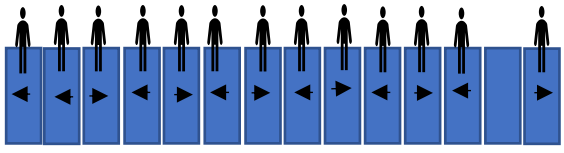

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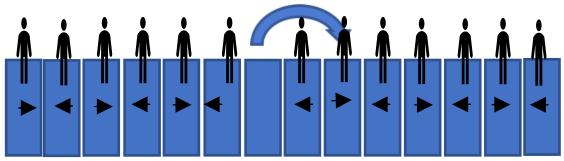

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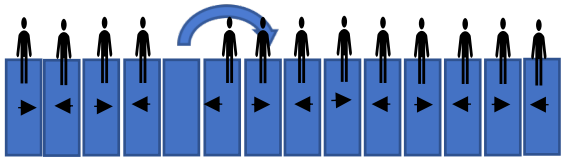

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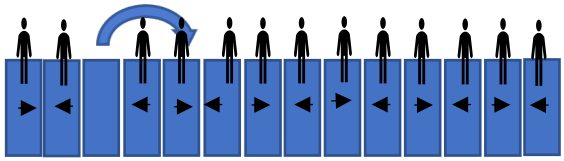

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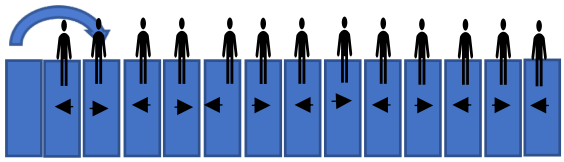

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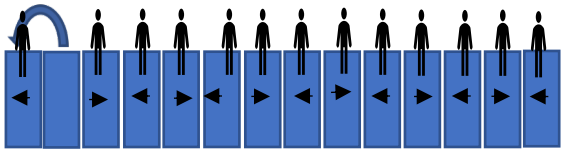

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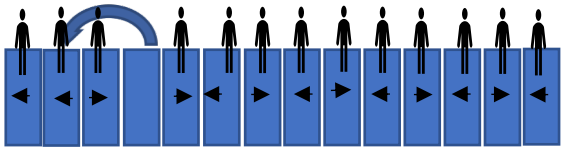

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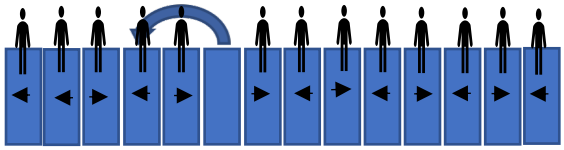

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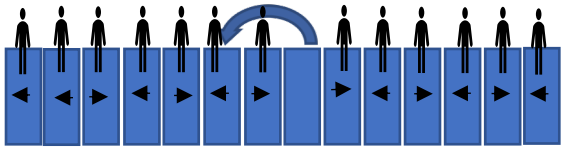

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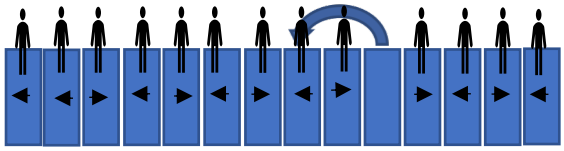

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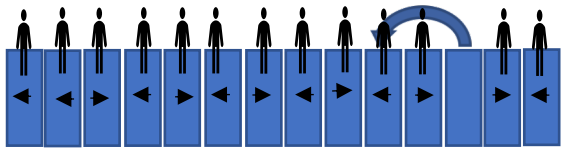

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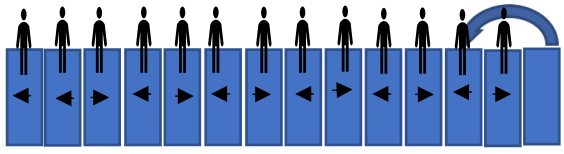

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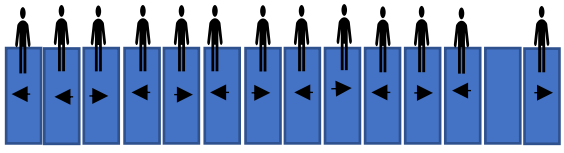

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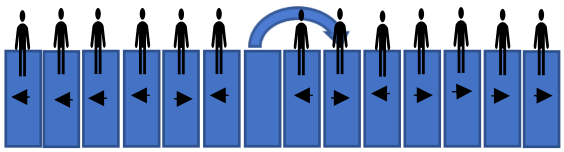

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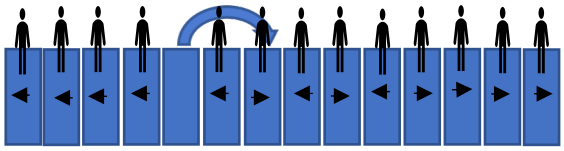

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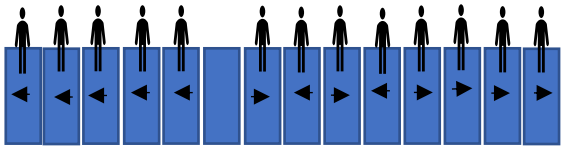

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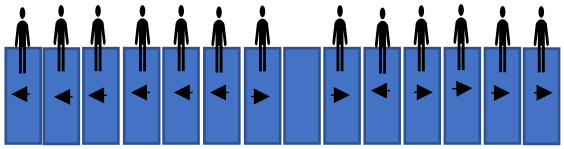

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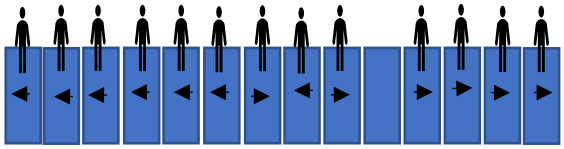

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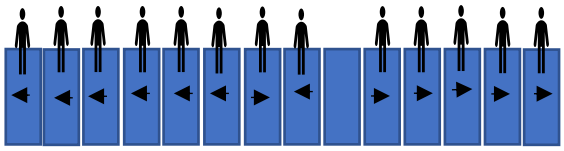

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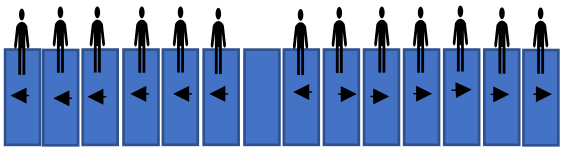

Step 55