The Evolution of Doctrinal Religions:

Using semantic network analysis and computational models to examine the evolutionary dynamics of large religions

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1. Introduction

Until about ten thousand years ago, a short period of time on an evolutionary time scale, human societies comprised small bands of mobile hunter-gatherers. Since then, civilizations have arisen encompassing hundreds of millions of people. In order for these groups to endure and compete successfully with other groups, the group requires at least some level of social cohesion. While we know a great deal from the archaeological record about the rise of large complex societies (Barker, 2009; Hayden, 2009; Mithen, 2006; Zeder, 2011), less is known about the psychological mechanisms involved in generating and sustaining social cohesion in large groups. The term *social cohesion* is used in many ways by different fields (Friedkin, 2004; McLeod & Von Treuer, 2013), however here social cohesion refers to the bonds between members of a social group as well as their bonds to the group as a whole.

Many groups, such as nationalities, ethnicities, and religions seem to maintain cohesion over hundreds and sometimes thousands of years, even in the midst of great changes both internally and externally—examples include contemporary world religions (e.g., Buddhism, Hinduism, and the Judeo-Christian traditions) that have their origins in the Axial age (Baumard, Hyafil, Morris, & Boyer, 2014; Bellah, 2011; Christian, 2005; Shults, Wildman, Lane, Lynch, & Diallo, 2018). In spite of the fact that the size of these groups makes it impossible to know every other member, individual members feel a sense of shared identity and belonging. The overarching aim of this thesis is to help explain why.

Of all the possible large groups, this research focuses on *doctrinal religions*—that is—cultural traditions involving the worship of supernatural agents[1] that emphasize the importance of adherence to a commonly shared set of beliefs or doctrine. While religious beliefs are not the only kind of doctrine, religious beliefs have been prominent throughout human history. Doctrinal religions have had significant historical and contemporary impacts. For example, the spread of Christianity has reshaped the geo-political landscape of the western world while the rise of religious extremism has been a major motivating force in shaping public policy in recent years (Toft, Philpott, & Shah, 2011).

The Divergent Modes of Religiosity (DMR) theory (also known as "modes theory"; Whitehouse, 1995, 2000, 2004a) proposes that different kinds of rituals produce different types and intensities of social cohesion. The theory suggests that rare and emotionally intense rituals can be used to bind the members of smaller, more localized religions to one another by means of mutually shared—often dysphoric—experiences. This results in intense social cohesion among small groups of individuals, such as the small bands of mobile hunter-gatherers of ancient prehistory (Whitehouse & Hodder, 2010). DMR theory states that rare but emotionally intense rituals are the basis of what it refers to as the *imagistic mode* of religiosity. In the imagistic mode, individuals derive personal meaning from rare but emotional experiences through personal reflection in lieu of any available standard orthodoxy with which to interpret the experience. An overview of the dynamics of the imagistic mode are provided in Chapter 2, Section 2.1.

[1] *Supernatural agent* is a term commonly used in the cognitive science of religion to describe non-natural entities that people believe can have their own intentions and autonomous effects on the world, colloquially the supernatural agents of world religions are often referred to as a Gods or deities.

The DMR theory also proposes a different way of creating and bonding very large groups, of the kind associated with the rise of nations, empires, and world religions called the *doctrinal mode* of religiosity. According to the DMR theory, the doctrinal mode relies on frequent (i.e., daily or weekly) collective rituals to help spread an orthodox doctrine by providing occasions for leaders to present beliefs of the group, making them more likely to be accurately stored in memory. Frequent rituals also provide occasions for leaders to correct unorthodox beliefs. This creates a situation for individuals to align themselves to a group based on a stable set of socially learned beliefs and practices.

The imagistic and doctrinal modes have been linked to separate types of group alignment: fusion and social identification (Whitehouse & Lanman, 2014). *Fusion* is best described as an intense feeling of oneness with a group. Fusion theory posits a synergistic relationship between personal and social identities (Swann, Jetten, Gómez, Whitehouse, & Bastian, 2012). *Personal identities* are the beliefs, values, attitudes, and knowledge that individuals have that make them unique; examples can include having a preference for certain types of literature, having certain personality traits, or having a belief in guardian angels. *Social identities* are social categories that one aligns with as part of how we see ourselves (these are discussed further in Chapter 2, Section 2.2).[2] Fusion theory suggests that the feeling of connectedness to a group is magnified in fused

[2] Personal and social identities are discussed in greater detail in Chapter 2, Section 2.2. As a terminological note, this dissertation uses the terms personal schema, personal identity, and self-image. These are all discussed at length below and refer to slightly different things. A *personal schema*, described on p. 7 of this dissertation, holds information that individuals have regarding their own personal experiences, knowledge about the world, beliefs, and values. As such, a personal schema holds the information from which individuals derive their personal identity in a similar way to how a *social schema* holds the information one holds about their social identity. *Self-image* is used to refer to the attitudes we have toward our self and the attitudes others might have toward us; throughout this dissertation it is used more selectively to refer to the emotional valence (positive or negative) one has for themselves regarding their group membership.

individuals because of the porous boundary between their self and their group (Swann et al., 2012). This intense bond is proposed to be extended to the individual members of the group as well (Swann, Buhrmester, et al., 2014; Swann et al., 2012). In principle, for fused individuals, when their social identity is salient, their personal identity is salient as well (and vice versa). This synergistic relationship can also facilitate the endorsement of extreme pro-group behaviours such as self-sacrifice and attacks against an outgroup (Swann, Buhrmester, et al., 2014). For example, studies have found that fused individuals are more likely to donate money and time to their in-group in times of crisis (Buhrmester, Fraser, Lanman, Whitehouse, & Swann, 2014). Fused individuals are also more likely to be found on the frontlines of armed conflicts than individuals who are not fused, who were found to play supportive roles outside of open combat (Whitehouse, McQuinn, Buhrmester, & Swann, 2014).

Fusion is thought to be quite different from social identification[3] (Swann et al., 2012). *Social identification* is a form of group alignment where someone feels they are part of a social category, referred to as a categorical tie (Swann et al., 2012; Whitehouse & Lanman, 2014) because they share beliefs, attitudes, and values that define that group with other individuals (Billig & Tajfel, 1973; Hogg & Abrams, 1988). Social identification posits an antagonistic relationship between personal and social identities (as opposed to the synergistic relationship proposed by fusion). As such, when one's social identity is salient, one's personal identity is supressed (and vice versa). Individuals can identify with a group in order to maintain a positive self-image, as

[3] To clarify, "social identification" is not the same as "social identity". Social identity is used as a noun to refer to the group (or groups) that one feels is a part of one's self concept. Social identification is used as a verb to describe a way of aligning one's self to a group. Similarly, the term social identity theory is used in this thesis, but it only refers to the theory as found in the psychological literature. These concepts are discussed further in Chapter 2.

opposed to fused individuals who are unable to separate their personal identity from their social identity. For example, when a group is being praised, an identified individual can identify more strongly with the group. However, when a group that an individual identifies with is being chastised, an identified—but not fused—individual can disidentify with the group and rely on their own personal identity to maintain a positive self-image (Swann et al., 2012).

It has been argued that high-frequency collective rituals associated with the doctrinal mode give rise to social identification (Whitehouse and Lanman, 2014). Whitehouse and Lanman argue that, since doctrinal beliefs and practices are learned from others rather than linked to a personally salient life experience, doctrinal beliefs are not necessarily connected to one's personal identity in the way that a significant personal experience would be. Because of this, Whitehouse and Lanman propose that doctrinal rituals lead to social identification, but doctrinal rituals' lack of effect on personal identities should not result in fusion. Whitehouse and Lanman suggest that social identification is depersonalizing (in the sense that the personal self is suppressed, and individuals can be interchanged with any other group member). However, Whitehouse and Lanman propose that memories for transformative life events, such as those experienced in imagistic ritual settings, can shape both personal and social identities, resulting in fusion. This is proposed to account for why, for highly fused individuals, social identity is connected to personal agency and why fusion is often described as a more 'intense' form of group alignment. These relationships and their effects on socio-political features of the DMR theory are discussed in Chapter 2, Section 2.1.

The DMR theory proposes that the two modes are separate and "divergent" trajectories that are reliant on different ritual styles, which foster different forms of group alignment and result in different levels of within-group consensus. Some historians working with the DMR theory argue that the claim that the modes are divergent is problematic given that several large doctrinal

religious traditions prominently incorporate rare and emotionally intense experiences into the tradition, such as those common to the imagistic mode, while other doctrinal religions perform frequent rituals with high emotional intensity (e.g., Clark, 2004; McCauley & Lawson, 2002; Paden, 2004; Pyysiäinen, 2005); neither of these ritual forms fit the pattern of doctrinal religions predicted by the DMR theory. There is also contemporary evidence of ritual forms that do not conform to the predictions of the DMR theory. Recent surveys have reported that an increasingly large number of Christians have had an intense religious experience (Pew Research Center, 2009a) and in some Christian traditions (e.g., Pentecostal and Charismatic Christians) such experiences are common—if not defining experiences for the group (Luhrmann, 2012; Miller & Yamamori, 2007).

Responding to these criticisms, it has been suggested that at least some such experiences in doctrinal traditions fail to produce imagistic outcomes because they "tend to strike lone individuals rather than groups and, so, are powerless to create the sort of localized group cohesion that typifies the imagistic mode" (Whitehouse, 2004b, p. 217). This might be taken to suggest that rare and emotionally intense experiences in doctrinal religions rarely, if ever, give rise to fusion. The DMR theory proposes that "[s]ince the two modes are clustered around fundamentally divergent dynamics, it follows that whenever they draw on a common stock of cognitive mechanisms, they do so in significantly contrasting ways" (Whitehouse, 2004b, p. 217). So, while the DMR theory appears to allow for the possibility of emotionally intense experiences in the doctrinal mode, the effects of these experiences are not necessarily the same as they would be in imagistic religions (this is discussed further in Chapter 2 section 2.1.1).

This dissertation focuses on two components of social cohesion: group alignment and within-group consensus.[4] I argue that the consolidation of information into personal and social schemas can explain patterns of group alignment and within-group consensus in doctrinal religions. A *schema* is "a source of general knowledge that tells us what to expect from observations, as well as providing a structure for understanding them" (Heit, 2003, p. 4072). Schemas are theoretical constructs that are updated by new experiences in our lives and can be used to fill in gaps in our knowledge of an event or narrative (Bartlett, 1932; Wagoner, 2013). This dissertation addresses two types of schemas: personal schemas and social schemas. A *personal schema* is information that individuals have regarding their own personal experiences, knowledge about the world, beliefs, and values. Additionally, a *social schema* is the beliefs, values, and attitudes that one attributes to a social group. Typically, a social schema is posited to include information that is shared among the members of the group, this within-group consensus facilitates mutual alignment to the group (Postmes, Spears, Lee, & Novak, 2005; Swaab, Postmes, van Beest, & Spears, 2007). While personal and social schemas hold different information, they are not considered to be mutually exclusive. Rather, personal schemas and social schemas can interact. For example, many individuals—as part of their personal schema—define themselves as members of a group, which is in turn defined by a social schema.

Further, I argue that fusion in large groups is the result of *conceptual ties* (ties between one's personal schema and essential beliefs of their group's social schema), formed by reflection

[4] As a point of terminological clarity, *within-group consensus* will refer to the extent to which members of a group share beliefs with the group at large, *between-individual similarity* will be used to refer to the extent to which two individuals share the same beliefs (but not necessarily with the group at large). Conceptual similarity refers to the similarity between beliefs within two individuals' schemas and is only referred to in the additional statistical results presented in Appendix 4.

on emotionally intense experiences with a doctrinal religion that come to be viewed as personally salient. Throughout this dissertation, *essential beliefs* are used to refer to those beliefs of a group that an individual would hold as definitional for that group (such as a Christian's belief in God or salvation through Christ). The IIS uses the term essential beliefs not to refer to a shared essence of a group as if all members of the group would have any one belief. Instead, the IIS looks at concepts at a more individualistic level but accepts that when an essential belief is shared by all members of a group it can appear and function like a group "essence." Understanding fusion as the result of conceptual ties presents a parsimonious explanation of some unexpected observations in the fusion literature and provides a new set of predictions concerning emotionally intense experiences in doctrinal religions.

1.1. Thesis Structure and Contributions

This research offers several contributions to our understanding of the nature and causes of social cohesion in doctrinal religions. Chapter 2 presents a new framework that aims to extend the DMR theory, which is framed in terms of an information processing approach referred to as the Information Identity System (IIS). The chapter discusses how the IIS reconceptualizes extended fusion and accounts for the patterns of social cohesion that result from emotionally intense experiences in doctrinal religions.

Chapters 3-5 present empirical studies that test key aspects of the IIS (the hypotheses are presented below in Table 1 and discussed in detail in Chapter 2). Chapter 3 tests the hypothesis (H1 in Table 1) that there is a positive relationship between frequency of in-group ritual attendance and social identification. This hypothesis is important for the DMR theory and the IIS and it is one of the key points of theoretical agreement between the two. Finding support for this hypothesis would suggest that there is a link between frequency of in-group ritual attendance and group

alignment via social identification. The hypothesis was tested using cross-cultural surveys to gather data on frequency of in-group ritual attendance, social identification, and fusion.

Chapter 4 investigates the role of reflection and the perceived centrality of an event on fusion; extending the earlier work on the role of reflection on fusion published by collaborators and myself (Jong, Whitehouse, Kavanagh, & Lane, 2016; my role in this research primarily involved reserach design). By *perceived centrality of an event* I refer to "the extent to which a memory for a stressful event forms a reference point for personal identity and for the attribution of meaning to other experiences in a person's life" (Berntsen & Rubin, 2006, p. 219), in this way, it is central to one's personal identity. Specifically, I tests the hypotheses (H2a) that the relationship between the emotional intensity associated with an experience and fusion to their group is mediated positively by both a) the perceived frequency of reflection on the experience and b) the perceived centrality of the event and (H2b) the relationship between the emotional intensity associated with an experience and fusion to God is mediated positively by both a) the perceived frequency of reflection on the experience and b) the perceived centrality of the event. Testing these hypotheses can provide a better understanding of the role of emotionally intense experiences in doctrinal religions and provide evidence for one of the key claims of the IIS that is not congruent with fusion or the DMR theory as they are currently formulated. Namely, finding evidence for the hypotheses would suggest that the IIS's idea that extended fusion results from the creation of conceptual ties after reflecting on an emotionally intense experience, which internalizes that experience as central to one's personal identity, may be a viable approach to fusion in doctrinal religions. This study uses a cross-cultural survey to gather data on social identification, fusion with their group, fusion with the concept God, if they have ever had an intense religious experience, and—if they have had an intense religious experience—the perceived centrality of the event, how

frequently they reflect on the experience, and the intensity of the experience. In addition, the data is used to address the findings of other studies published in the field (i.e., Buhrmester, Burnham, et al., 2018; Jong et al., 2016).

Chapter 5 presents an additional study, which tests the hypothesis that the relationship between frequency of in-group ritual attendance and within-group consensus should be positively mediated by social identification but negatively mediated by fusion. This hypothesis is unique to the IIS and finding evidence for it helps to clarify some of the issues with our understanding of fusion (discussed in Chapter 2, Section 2.2.2.3), and help researchers understand the effects of different forms of group alignment on within-group consensus. This could help us understand social cohesion because it can be argued that it is critical that members of a group have similar beliefs about the group, otherwise, while survey measures could establish that participants align with a social category with the common name, participants might understand that group to be represented by vastly different beliefs. If evidence is found to support the links between ritual experiences, different group alignment styles, and patterns of within-group consensus, it can provide more evidence for the link between social identification, fusion, and how these forms of group alignment affect the relationship between one's personal beliefs and that of their social group. The study aims to compliment the previously mentioned survey measures by employing a semi-structured interview to gather data on within-group consensus in doctrinal religions. To measure within-group consensus, I quantify the conceptual relationships that participants present in a semi-structured interview using a technique known as semantic network mapping. For succinctness, all hypotheses are presented in the table below:

Table 1

Table of hypotheses, their names, and the chapters in which they are tested.

Hypothesis Name	Hypothesis	Chapter Investigated
H1	Frequency of in-group ritual attendance is positively correlated with social identification when controlling for fusion.	3
H2a	The relationship between the emotional intensity associated with an experience and fusion with a doctrinal religion is mediated positively by both a) the perceived frequency of reflection on the event and b) the perceived centrality of the event.	4
H2b	The relationship between the emotional intensity associated with an experience and fusion with the concept God is mediated positively by both a) the perceived frequency of reflection on the event and b) the perceived centrality of the event.	4
H3	The relationship between frequency of in-group ritual attendance and within-group consensus is mediated a) positively by social identification and b) negatively by fusion.	5
AH1	There is a positive correlation between one's total network degree and their within-group consensus.	5
AH2	There is greater between-individual consensus with those individuals that a participant is connected to than those with which there is no connection.	5

The datasets collected for this research are valuable contributions to our understanding of social cohesion in doctrinal religions. Few datasets include data on a participant's religious beliefs and behaviours as well as psychologically validated measures of group alignment.[5] The fact that the resulting dataset includes both measures of social identification and fusion makes the dataset a valuable resource that can be utilized by future researchers.

In addition, developing the use of semantic network mapping to investigate within-group consensus using data collected using traditional fieldwork techniques is another contribution of

[5] To my knowledge, the only other data set that includes multiple measures of fusion and social identification was collected after this research was conducted (Bortolini et al., 2018). It includes data from only one country (Brazil). The dataset reported in the present research includes responses drawn primarily from five countries (US, UK, Singapore, New Zealand, and India).

this research. This technique allows for one to analyse text data drawn from a variety of sources, such as transcripts of semi-structured interviews, in order to structure the concepts presented in the transcript so that their responses can be measured to analyse the within-group consensus of the social group from which the sample is drawn. However, this technique is not limited to semi-structured interviews and could potentially be a valuable method for analysing other data-sets of interest to anthropologists, such as data drawn from online social networks (this possibility is discussed in Chapter 6).

Chapter 6 presents a discussion of the general findings of the present research, future directions and ethical concerns for the methods developed in Chapter 5, and how future directions can also address additional aspects of the DMR theory, devoted actor theory, and our understanding of schisms. Lastly, Chapter 7 presents several conclusions that can be drawn from this research in relation to the generation and maintenance of social cohesion in large doctrinal religions.

2. Theoretical Framing

This dissertation focuses on explaining social cohesion in doctrinal religions by addressing the role of ritual experiences in creating schemas that produce different patterns of group alignment and within-group consensus. The DMR theory offers a scientific explanation that links differences in the frequency and emotional intensity of rituals performances to different patterns of social cohesion. In this chapter, I discuss the DMR theory and outline the key features of doctrinal religions. I then present a more in-depth discussion of the psychological mechanisms in the DMR theory that facilitate the link between personal and social schemas and patterns of social cohesion; namely, memory and group alignment. After this, I present a new framework for approaching the relationship between ritual, memory, and group alignment, which I call the Information Identity System (IIS).

The IIS is an extension of the DMR theory. The DMR theory offers an explanation for different patterns of social cohesion in religious groups by focusing on the way in which different types of rituals elicit different memory mechanisms and, thus, produce different forms of group alignment. The IIS frames memory as a dynamic process—as opposed to the more heuristic approach to memory used by the DMR theory. I argue in Chapter 2, Section 2.3.2, that this extends the DMR theory in such a way that it facilitates more accurate predictions for a wider range of rituals and group alignment styles found in doctrinal religions. In this light, the IIS is not seeking to replace the DMR theory; rather, it is presented in the spirit of theoretical revision as an aspect of the scientific method. The key variables of the DMR theory (and their corresponding settings for the doctrinal and imagistic modes) are presented in Table 2 below. In the final column, the

predictions made by the IIS extension proposed in this research concerning emotionally arousing doctrinal rituals are added to succinctly show the key aspects on which it differs from the DMR theory's earlier predictions (discussed in Section 2.1.1).

Table 2

Psychological and Socio-political variables of DMR and IIS.

Variable	Doctrinal	Imagistic	Emotionally Intense-Doctrinal
Frequency of ritual performance	High	Low	High
Level of emotional intensity	Low	High	High
Principal memory system	Semantic	Episodic/flashbulb	Semantic consolidation
Techniques of revelation	Rhetorical, logical integration, and narrative	Iconicity, multivocality, and multivalence	Narrative and reflection
Group alignment style	Social identification	Fusion (local)	Fusion (extended)
Primary tie style	Categorical	Relational	Conceptual
Social cohesion	Diffuse, mild	Intense	Intense
Leadership	Dynamic	Passive/absent	Dynamic
Inclusivity/ exclusivity	Inclusive	Exclusive	Cautiously inclusive
Spread	Rapid, efficient	Slow, inefficient	Rapid
Scale	Large	Small	Large
Degree of uniformity	High	Low	High overall with some significant idiosyncrasies
Structure	Centralised	Noncenteralised	Centralised

Note: Variables associated with the DMR theory are presented in the columns Doctrinal and Imagistic. Variables associated with the IIS in the column titled "Mixed-Doctrinal." It also includes group alignment styles and primary tie styles. In Whitehouse's original presentation of these variables, he refers to "transmissive frequency." I have changed this to "Frequency of ritual performance" to maintain continuity with the phrasing used in this research.

In the following section, I outline the key aspects of the DMR theory in detail. Then, I discuss the mechanisms of group alignment proposed by the DMR theory in greater detail (in Section 2.2) before discussing how the DMR theory can be amended to better explain the observed patterns of emotionally intense rituals in doctrinal religions such as Pentecostal and Charismatic Christianity.

2.1. The Theory of Divergent Modes of Religiosity

The DMR theory proposes that cognitive mechanisms that develop in all humans can explain patterns of observed religious behaviours (Whitehouse, 2004a, pp. 21–22)—such as group alignment and within-group consensus. It describes six psychological and six socio-political features that should generally be observed together in a religious system. The DMR theory posits that ritual systems tend to come in one of two modes: imagistic or doctrinal. Each mode is reliant on one of two types of rituals to encode information in our memories. The imagistic mode is said to rely on rare and emotionally intense (often dysphoric) rituals, while the doctrinal mode is said to rely on high frequency rituals with low levels of emotional intensity. The DMR theory states that each of these two ritual forms effectively encode information in our long-term memory, where it can be stored and recalled for later use. *Long-term memory* is memory that is retained and available for use over longer periods of time (from minutes to decades) than short-term memory, which is memory that is only available for a brief period and is forgotten unless it is rehearsed.[6]

[6] Long term memory can be considered in terms of two additional forms: non-declarative and declarative. *Non-declarative* memory (sometimes called implicit memory) refers to memories that one does not have direct access to recall. For example, how to walk or ride a bike are non-declarative memories; those who can perform those tasks can remember how to perform these tasks but cannot fully describe how to perform them. *Declarative memory* (sometimes called explicit memory) is the information that we can express. This would include our cultural and religious beliefs, acquired knowledge, personal experiences, and personal histories. Therefore, when we refer to culturally transmitted beliefs that can serve as the basis for social cohesion, we are in fact referring to information stored in declarative memory.

One of the DMR theory's key observations is that rituals generally come in one of two forms: 1) high-frequency of performance with low emotional intensity and 2) low-frequency of performance with high emotional intensity (Atkinson & Whitehouse, 2011). The DMR theory proposes that these two ritual types activate different memory systems, which facilitate different patterns of social cohesion.

Rituals in doctrinal traditions are proposed to be high-frequency with low emotional intensity and should elicit semantic memory. *Semantic memory* "refers to knowledge about people, objects, actions, relations, self, and culture acquired through experience" (Binder, Desai, Graves, & Conant, 2009, p. 2767). Information encoded in semantic memory extends beyond schoolbook knowledge and includes beliefs and practices valued by our social groups. Decades of empirical research suggest that semantic memories form through multiple exposures to the same information (e.g., Aldridge & Crisp, 1982; Gardiner, Gawlik, & Richardson-Klavehn, 1994; McFarlane & Humphreys, 2012; Wixted, 1991). As the semantic memory system does not encode where you were when you learned something or from whom you learned information, semantic memories appear decontextualized (i.e., they are unattached to any specific social relationships or physical context). In this sense, the information held by one person is just as valid as that of another. Within the framework of the DMR theory, this is stated to result in depersonalized information that is not associated with any one person (Whitehouse, 2004a). In addition, the DMR theory proposes that revelation in the doctrinal mode is the result of instruction and logical integration and any personal idiosyncrasies should be corrected during the frequent ritual events that typify doctrinal religions. This should produce stable schemas of information that are socially shared among potentially large number of individuals.

The DMR theory notes that semantic memory can efficiently create and maintain complex schemas of information that are shared between the members of a group. These complex schemas can be transmitted by leaders or texts and, over long periods of time with frequent repetitions, result in complex narratives and teachings being integrated into a set orthodoxy. Because semantic memory encodes information such as socially shared norms and beliefs, frequent ritual attendance can encode social information that individuals can use to align themselves to groups by means of social identification (Whitehouse & Lanman, 2014), which—as noted in Chapter 1—is a form of group alignment where individuals feel that they are part of a social category (i.e., group) because they have shared social schemas holding the beliefs, attitudes, and values that define that group.[7] Whitehouse and Lanman suggest that this form of group alignment can be understood as a perceived *categorical tie* or tie between the individual and a social category (cf. Brewer & Gardner, 1996).

Rituals in imagistic traditions are proposed to be rarer and more emotionally intense (particularly dysphoric) and elicit a type of episodic memory called a flashbulb memory. *Episodic memory* is the information we retain for a specific event. This includes everything from what one does on any particular day to great milestones in one's life. Empirical evidence suggests that if an event is particularly emotionally intense, such as being a victim of a crime or witnessing a tragic event, it can result in a flashbulb memory (Conway, Skitka, Hemmerich, & Kershaw, 2009; Curci & Luminet, 2009; Kvavilashvili, Mirani, Schlagman, Foley, & Kornbrot, 2009). *Flashbulb*

[7] Whitehouse writes: "Schemas of this type form the cognitive underpinnings of universalistic ideology or, indeed, any conception of a community whose members are not individually specifiable. Religious identity, in the doctrinal mode, is primarily conferred on the basis of presumed commonalities in the thought and behaviour of anonymous others, a state of affairs which is only conceivable with reference to semantic knowledge" (Whitehouse, 2000, p. 10).

memories are like images, where one can imagine the context of the memory (such as who they were with during an event) but not specific details of the memory (such as exactly what any one person said during an event). Flashbulb memories encode information almost like pictures and can be recalled in detail years after the event. They create a record in our mind of details such as who was present at the event, what it looked like, and where it took place. In theory, flashbulb memories should not facilitate memories for what was said during the event because a single presentation of information would not be enough to encode the information in semantic memory. Indeed, some research shows that flashbulb memories are not good at encoding information about what was said during emotionally intense rituals, such as those involving fire-walking (Xygalatas, 2012; Xygalatas et al., 2013). Therefore, individuals cannot rely on teachings during an event that resulted in a flashbulb memory to draw meaning from the experience in the same way that someone might from a doctrinal ritual. The DMR theory posits that, because emotionally intense experiences are not encoded with information regarding the meaning for a ritual experience, individuals will reflect upon the experience to make sense of it. This is different from the DMR theory's proposition for the doctrinal mode, which suggests that reflection is supressed because frequent rituals encode the meaning of ritual experiences as provided by the group's leadership. In the imagistic mode, reflection is typically assumed to be personal and untutored, which can lead to idiosyncratic beliefs becoming diffused throughout the group (Whitehouse, 2004a, p. 72). If these idiosyncratic beliefs are not diffused throughout the group, they could potentially decrease within-group consensus overall (repercussion of this are discussed in section 2.3 and Chapters 5 and 6).

Because of the intensity of events that create episodic memories, the events can potentially become defining aspects of how we see our personal self. However, they can also affect how we

align ourselves socially. The DMR theory proposes that flashbulb memories about who was at an intense event facilitate intense life-long bonds between co-participants. These intense bonds between the individual members of a group are called *relational ties* (cf. Brewer & Gardner, 1996). Whitehouse and Lanman (2014), along with other fusion theorists (e.g., Gómez, Brooks, et al., 2011; Swann & Buhrmester, 2015; Swann et al., 2012), suggest that relational ties are the basis of fusion (this is also discussed in section 2.3).

The psychological features of each mode are also proposed to have unique socio-political correlates. The DMR theory states that doctrinal religions are typically larger than imagistic religions. Doctrinal religions spread quickly because they are bound by how widespread the group's beliefs can become. They often use texts and religious experts in complex hierarchies that can authoritatively police beliefs to ensure the stability of the doctrine. Religious authorities can utilize the frequent ritual gatherings as occasions to both spread orthodox doctrine and correct any deviations. This results in high levels of within-group consensus. Additionally, because the group boundary is defined by holding a set of beliefs, doctrinal religions are considered to be inclusive of individuals who may not have previously participated in the group's rituals.

The imagistic mode has a different set of socio-political features. The DMR theory states that the sizes of groups operating in the imagistic mode are smaller than in the doctrinal mode as practical considerations constrain the number of participants that can participate in a ritual. For example, high costs of performing a ritual (in terms of resource expenditure per person) can limit the number of people who can participate. The DMR theory argues that, because group membership in the imagistic mode is premised upon having undergone an infrequent (and costly) ritual, the groups are more exclusive and do not spread as quickly as doctrinal religions; they only grow as fast as individuals can participate in its key ritual(s). In addition, the DMR theory posits

that imagistic groups do not need active leadership or a complex hierarchy to reinforce orthodoxy because there is no set doctrine to police (recall that beliefs in the imagistic mode are more reliant on independent reflection than teachings); this results in low within-group consensus among the members of the group.

The relationships proposed by the DMR theory appear to be a useful heuristic for understanding how religious experiences can affect the two components of social cohesion. *Prima facie*, doctrinal religious groups are reliant on frequent rituals with low emotional intensity: Christianity, Islam, and Judaism all perform weekly low arousal rituals. However, there are several examples of atypical rituals that present problems for the DMR theory's explanation of social cohesion in doctrinal religions.

2.1.1. Atypical ritual forms in doctrinal religions

In the historical and ethnographic record, doctrinal religions, such as Christianity and Islam, include rare but highly arousing ritual experiences in addition to their weekly low arousal rituals. For example, Sunni and Shi'a Islam, which have over 1 billion combined members (Pew Research Center, 2009b, p. 8), mandate that adherents complete a pilgrimage to Mecca (the Hajj), which typically happens once in a lifetime. Catholicism, a religion with over 1 billion members (Pew Research Center, 2011, p. 23), mandates rituals such as baptism, confirmation, and marriage—which only happen once in a lifetime. Other rare and emotionally intense religious experiences are more common today than they were 50 years ago in some areas. For example, a survey of Americans in 1962 found that 22% of respondents reported having a mystical experience; this has steadily increased to 49% by 2009 (Pew Research Center, 2009a). In addition, having emotionally intense religious or spiritual experiences is defining for many Pentecostal and Charismatic Christian communities (Luhrmann, 2012; Miller & Yamamori, 2007; Pew Research Center, 2006).

Of the many examples of emotionally intense experiences in doctrinal traditions, this research will focus on those that occur within contemporary Christian communities, particularly those in Pentecostal and Charismatic Christian communities. As discussed in this section, the DMR theory needs to be amended in order to provide an explanation for social cohesion in doctrinal religions that incorporate emotionally arousing experiences. Key to this amendment are the relationships between frequency of in-group ritual attendance, emotional intensity, memory, and group alignment.

The DMR theory suggests that emotionally intense rituals in the doctrinal mode should not have the same effects as emotionally intense rituals in the imagistic mode. One reason the DMR theory suggests this is because highly arousing experiences in doctrinal religions often happen to individuals (not as part of a group) and the experiences are not systematically integrated into the group's tradition. There are many examples of individual spiritual experiences in doctrinal religions that are not shared with a wider community, such as the kind of mystical and revelatory experiences documented by William James in his text *The Varieties of Religious Experience* (1902) or more recently discussed by Anne Taves in her book *Revelatory Events* (Taves, 2016). Within studies of the DMR theory, similar examples have been discussed regarding medieval Christian monasteries (Clark, 2004) and evangelical Christian groups (Malley, 2004).

However, earlier presentations of the DMR theory by Whitehouse have discussed instances of imagistic features in Melanesian doctrinal religions that are not limited to individual experiences (e.g., Whitehouse, 2000, Chapter 6). Whitehouse suggests that interactions between the two modes typically come in the form of doctrinal religions that have temporary imagistic practices. Whitehouse argues that brief periods where emotionally intense rituals are found in doctrinal religions serve to periodically reinvigorate communities that have lost motivation for high

frequency ritual practises with low emotionality. In addition to noting that these imagistic practices typically only last for a few months, the imagistic practices should result in bonding localized communities (Whitehouse, 2000, p. 135)—not entire doctrinal traditions. As such, bonding should rarely affect an entire doctrinal religion and when it does it is because multiple local communities realize they have all shared the same experience post hoc; examples include the Paliau Movement and Pomio Kivung in Papua New Guinea (Whitehouse, 2000, Chapter 6).

Malley's account of emotionally intense experiences in the Creekside Baptist Church, shares some similarities to the account of Melanesian religions presented by Whitehouse and is relevant to the example of Pentecostal and Charismatic Christianity. Generally, individuals in Creekside Baptist Church report having emotionally intense experiences individually—typically during a time of hardship. He notes that individuals are later encouraged to frequently recount their experiences publicly to the church (called testifying), which is a common practice in many evangelical churches. Malley considers this to vicariously increase the motivation of other members of the church, suggesting that "the reinforcement is individual, but the institution benefits" (Malley, 2004, p. 86). This account from a contemporary American evangelical church parallels the Melanesian account presented by Whitehouse in that intense experiences are not happening as part of the overall tradition. Rather they are happening to an individual in private or in small groups. Individuals come to perceive these experiences to be collective after they are encouraged to share their personal experience.

In addition to individual emotionally intense experiences, doctrinal religions can also have emotionally intense ritual experiences, such as those observed in Charismatic and Pentecostal churches. In Charismatic and Pentecostal churches, regular Sunday services often have dancing, loud music, and flashing lights that serve as a backdrop to intense experiences for some of their

members. The intensity of these experiences is evidenced by observations of glossolalia (speaking in tongues) or worshippers being *slain in the spirit*, as it is often called in Pentecostal and Charismatic Christianity, which is when a worshipper falls to the floor during worship, often appearing to lose consciousness. This is interpreted as the result of the worshipper being filled by, or overcome with, the presence of the Holy Spirit, which is one of the three entities in the Christin Holy Trinity: God, The Son (in reference to Jesus), and the Holy Spirit. These experiences should not be dismissed as rare or anomalous within Christianity. Pentecostal and Charismatic Christianity currently comprises over half a billion people, roughly a quarter of all the world's Christians (Pew Research Center, 2011). However, it is important to note that it is not always the case that every individual is having an emotionally intense experience (such as being slain in the spirit) on a weekly basis. While the rituals at Pentecostal and Charismatic Christian churches typically facilitate the possibility of these experiences for the congregation, any one individual member might only experience being slain in the spirit once in their lifetime.

The DMR theory makes multiple predictions about emotionally intense rituals in doctrinal traditions. However, it does not appear that Pentecostal and Charismatic Christianity fit the predictions of the DMR theory. In what follows, I outline the DMR theory's predictions and how Pentecostal and Charismatic Christian traditions do not fit these predictions before turning to the ways in which we can extend the DMR theory to better understand the role of emotionally intense ritual practices in doctrinal religions.

The DMR theory makes five predictions regarding why emotionally intense rituals should be short lived (i.e. the ritual will fail to be transmitted) in doctrinal religions: 1) Emotionally intense rituals that are not frequently repeated should ultimately result in a tradition that resembles the imagistic mode. 2) Emotionally intense rituals that are frequently repeated should suffer from poor

verbal transmission, as their high levels of emotional intensity are supposed to impede semantic memory formation. As such, the performance frequency of the ritual will be reduced, and they will begin to operate within the imagistic mode. 3) The rituals will begin to accommodate lower levels of emotional intensity and the poorly transmitted ritual can survive without modal effects. 4) The ritual can go extinct due to poor verbal transmission. 5) The DMR theory also states that if the ritual is frequently performed, emotional intensity can be lowered, at which point the ritual will conform to the standard attractor position of the doctrinal mode (see Whitehouse, 2004a, fig. 9.1).

Pentecostal and Charismatic Christian churches seem to be doctrinal traditions with imagistic features, but they do not appear to fit the DMR theory's predictions. The rituals of Pentecostal and Charismatic Christians are weekly, so they would not qualify as infrequent. However, it is not uncommon for Pentecostal and Charismatic Christians to have rare emotionally intense experiences within frequently performed rituals. In addition to being slain in the spirit, one experience that is common to Pentecostal and Charismatic Christians is being *born again*. The experience is typically described as positive and very transformative. This experience typically happens once and is considered by Christians to be a form of "spiritual rebirth" (Luhrmann, 2012). Being born again is surprisingly common. Indeed, the 2004 General Social Survey, which collected data on a nationally representative sample from the United States (US) found that 32.8% of respondents claimed to have had a born again experience (Davis & Smith, 2004; T. W. Smith, 2006). Burgess reports that 51 percent of all individuals who are born again consider themselves to be Charismatic Christians and that charismatic churches make up almost a quarter of all Protestant Churches (Burgess, 2005). However, Pentecostal and Charismatic Churches do not appear to be imagistic religions because of their size, frequent (weekly) rituals, hierarchy, focus

on orthodoxy, and inclusivity towards outsiders as evidenced by their positive outlook toward evangelism.

Concerning the second prediction, the data does not suggest that individuals in Pentecostal and Charismatic traditions are attending less frequently. In fact, a cross-cultural survey by the Pew Research Center found that a higher percentage of Pentecostal and Charismatic Christians claim to attend weekly services than Christians from other denominations in 9 of the 10 countries surveyed (Pew Research Center, 2006, p. 20). If the prediction is interpreted as addressing the frequency with which the tradition will perform the ritual (regardless of who attends) there have been no large-scale shifts noted in the literature. Pentecostal and Charismatic Christian churches are still reliant on weekly rituals.

Additionally, it does not seem that Pentecostal and Charismatic Christian churches have adjusted their emotional intensity levels to conform to the attractor arrangement of doctrinal religions (high-frequency and low emotional intensity). Nevertheless, the predicted negative effect on verbal transmission is difficult—if not impossible—to estimate from the available ethnographic or historical accounts and there is not much empirical data on the subject. This question is discussed in Section 2.3 and it is the subject of Chapter 5.

The fourth prediction is that the tradition will go extinct. This does not seem to be the case for Pentecostal and Charismatic Christianity either. The Pentecostal movement began in the American Midwest in 1901 when students in the Bethel Bible School (Topeka, Kansas) began having ecstatic experiences and speaking in tongues. By the 1960s, individuals having intense experiences speaking in tongues or being slain in the spirit were reported in Roman Catholic and Protestant churches as well; known originally as the “Charismatic Revival” (Miller & Yamamori,

2007). The fact that these practices have been continually occurring for over a century and includes multiple generations of adherents seems to violate the DMR theory's prediction.

The fifth prediction is that emotional intensity levels associated with the ritual can be lowered. However, it appears that the emotional intensity levels in Pentecostal and Charismatic communities have been maintained. A 2006 survey by the Pew Research Center found that a majority of Pentecostals and Charismatics in 10 countries attend services where there is speaking in tongues, spiritual faith healings, or exorcisms (Pew Research Center, 2006), suggesting that the practices that defined the community decades ago are still prevalent today.

The finding that so many Pentecostal and Charismatic Christians in the world are attending rituals with high levels of emotional intensity also suggests that there are critical differences between the Creekside Baptist Church and Melanesian religions and Pentecostal and Charismatic Christianity. Specifically, unlike the Creekside Baptist Church and Melanesian traditions, modern Pentecostal and Charismatic practices are not relegated to individual experiences that happen in isolation. These intense experiences are occurring in settings where the experience is shared with a large congregation (potential effects of this are discussed further in Section 2.3).

Additionally, Pentecostal and Charismatic Christian churches do not seem to be collections of localized communities that only come to perceived that they share an experience upon later reflection. Unlike the reports from Melanesian religions and the Creekside Baptist church, individuals in Pentecostal and Charismatic churches are not having these experiences in isolation or small communities. In some cases, they are having these experiences in congregations that sometimes have tens-of-thousands of individuals (known as mega-churches). The size of mega-church congregations precludes the possibility that members could all be bonded by means of episodic memories for mutually shared experiences with specific individuals, as is the case in the

imagistic mode. In addition, Pentecostal and Charismatic churches of all sizes seem to share a core set of beliefs and practices from which they draw their identification. For example, many churches even invite pastors from other churches to preach on Sundays and members attend large retreat events, such as the Hillsong retreat which draws 30,000 individuals annually from churches all over the world (Koziol, 2015) and invites leaders from multiple churches preach at the event.

In order to better understand the nuances of group alignment in doctrinal religions that could be relevant to these practices, I discuss the literature on group alignment in the next section, specifically focusing on its relationship to ritual and the formation of schemas. I end the section by highlighting several anomalies in the group alignment literature. Then, in section 2.3, I outline how the IIS extension to the DMR theory can clarify aspects of social cohesion in doctrinal religions and offers a new explanation of the effects of atypical forms of doctrinal ritual as well as several anomalies in the group alignment literature.

2.2. Group Alignment

Social identity theory and fusion theory each propose different ways in which personal and social identities interact that have distinct consequences for group alignment in doctrinal religions. These are each outlined in the following sections as a more nuanced understanding of these group alignment processes can help elucidate the issues addressed by the current research.

2.2.1. Social Identification

Social identity theory proposes that people can represent groups as social categories by representing groups as prototypes, or "context-specific fuzzy sets that define and prescribe attitudes, feelings, and behaviours that characterize one group and distinguish it from other groups" (Hogg, 2001, p. 6).

Social identity theory posits the *principle of functional antagonism* (Turner, Reynolds, Haslam, & Veenstra, 2006), which states that when personal identity is elicited, social identity is supressed and vice versa. Social identity theory states that individuals can have multiple social identities and identify with different groups in different contexts or highlight their unique personal identity to maintain a positive self-image (see Ashmore, Deaux, & McLaughlin-Volpe, 2004; Mccauley, 2006; Settles, 2004). So, while an individual can dissociate their personal and social identities (as described by the principle of functional antagonism), they align with groups that share their beliefs. In this way, there is congruence between a person's beliefs and the set of beliefs defining the social category to which they align. However, these beliefs are held in such a way that the person can functionally separate their self-image from the beliefs of their group if the beliefs associated with that group no longer support a positive self-image. As such, in contexts where a person's social group is criticized publicly, an individual can still maintain a positive self-image. The process whereby one dissociates oneself from a social group in order to maintain a positive self-image is called *disidentification* (Bhattacharya & Elsbach, 2002; Elsbach & Bhattacharya, 2001; Jans, Postmes, & Van der Zee, 2011). An example of disidentification would be someone who is socially identified with a group that is publicly criticised (such as the NRA), and rather than defending the group, insists that he/she is different from the group because of their own personal beliefs (i.e., personal identity). On the other hand, in times of personal uncertainty, identifying with a social group can provide a sense of certainty by tying one's own fate to that of their group (Buhrmester et al., 2012; Ellemers, Spears, & Doosje, 2002).

Social psychologists have shown that individuals can identify quite easily with groups. For example, psychologists have shown that using 'minimal groups', created simply by assigning individuals to a "blue group" or "red group" and making this group socially salient, is sufficient to

induce ingroup favouritism and outgroup derogation (Otten, 2016). Empirical evidence from the social identity literature supports the idea that individuals can have multiple identities (e.g., Brewer & Pierce, 2005; Mccauley, 2006; Settles, 2004; Steffens, Jetten, Haslam, Cruwys, & Haslam, 2016; Turner-Zwinkels, Postmes, & Van Zomeren, 2015); however, the present research only focuses on an individual's religious identity.

2.2.2. Fusion

Fusion has been sharply distinguished from social identification (Swann et al., 2012). Fusion theorists have proposed four principles, outlined by Swann et al., (2012) and further clarified by Fredman et al., (2015):

1. The *agentic personal self principle* states that even when social identities are salient, "the personal self can motivate pro-group behavior by channelling personal agency into pro-group action" (Fredman et al., 2015, p. 470).
2. The *identity synergy principle* states that personal identities combine with social identities and individual agents can be motivated to enact sacrificial or extreme behaviour on behalf of the group (Swann et al., 2012, p. 443).
3. The *irrevocability principle* states that once a person is fused, it causes such an emotional mark on the individual that they will remain fused (Swann et al., 2012, p. 443). This has been shown to be the case even when individuals are ostracized by their own in-group (Gómez, Morales, Hart, Vázquez, & Swann, 2011, p. 1576).
4. The *relational ties principle* "assumes that strongly fused persons feel attached to individual members of the group as well as to the abstract 'collective'. As such, strongly fused persons should be especially inclined to endorse sacrificing their lives

not only for the group as an abstract collective but also to save the lives of individual members of the group" (Fredman et al., 2015, p. 472).

These principles suggest that there are several differences between social identification and fusion. The agentic personal self principle suggests that even when a social identity is salient, individuals can be personally motivated toward group action. Social identity theory would propose that personal motivations are more salient when personal (not social) identities are salient. As such, the identity synergy principle stands in direct juxtaposition social identity theory's principle of functional antagonism. For fused individuals, their personal and social identities can be said to have a porous boundary, where the two are not fully separated, and eliciting either their personal or social identity will make the other salient as well. In theory, a fused individual views the social group as being—in many ways—an extension of one's own self. As such, fused individuals feel a "visceral feeling of oneness" with their group (Swann et al., 2012, p. 450), which makes it difficult for an individual to separate their personal identity from their social identity. In addition, the irrevocability principle posits that fused individuals will remain fused. This suggests that the inability to disidentify with the group is not just a temporary state, but a permanent "trait-like" condition where individuals will support the group indefinitely, unlike socially identified individuals who are proposed to disidentify in order to maintain a positive self-image. Lastly, the relational ties principle states that fused individuals bond to specific individuals, as well as the collective group. Social identity theory makes the prediction that individuals bond to collective individuals as social categories.

One important point concerning fusion and social identification is that empirical evidence has shown that, generally, individuals with high levels of fusion also have high levels of social identification. However, it is not typically the case that individuals with high social identification

also have high levels of fusion (Buhrmester et al., 2012, 2014; Gómez, Brooks, et al., 2011; Gómez, Morales, et al., 2011; Jong et al., 2016; Páez et al., 2015; Whitehouse et al., 2017, 2014). Currently, some fusion theorists posit that it may not be possible for an individual to have high levels of fusion but *not* high levels of social identification (see Swann, Gómez, Seyle, Morales, & Huici, 2009, p. 1008). Indeed, it is hard to conceptualize how one could be fused—i.e., unable to dissociate one's personal and social identities—if they do not have some significant level of commitment to a social identity.

The distinction between highly-identified individuals who are fused and highly-identified individuals who are not fused has been shown to underlie important behavioural differences. For example, highly-identified individuals who are highly-fused are more prone to endorse extreme behaviours (Gómez & Vázquez, 2015; Swann, Buhrmester, et al., 2014; Swann & Buhrmester, 2015; Swann et al., 2009), exhibit greater endorsements of self-sacrifices for their group (Swann, Buhrmester, et al., 2014; Swann, Gómez, et al., 2014), they appear to exhibit greater levels of cooperation (Whitehouse et al., 2017), and appear more likely to defend their group through physical (and sometimes violent) actions (Gómez et al., 2017). Individuals who are highly-identified but not highly-fused do not show the same patterns. The observation of predicted outputs of fusion theory that are distinct from the outputs of social identity theory lends credence to the idea that social identification and fusion address distinct forms of group alignment.

To better clarify how fusion can relate to social cohesion in doctrinal religions, we can discuss two forms of fusion noted in the literature: local and extended. *Local fusion* is when "group members form relational ties with others with whom they have direct personal contact and thus have the opportunity to share experiences," while *extended fusion* is when people "project the relational ties normally associated with local fusion onto large groups despite having little or no

direct contact or shared experiences with individual members" (Swann et al., 2012, p. 443). Fusion theory does not suggest that the four principles discussed above are unique to either local or extended fusion. In addition, researchers generally suggest that both forms of fusion result from emotionally intense dysphoric experiences (e.g., Buhrmester et al., 2014; Jong et al., 2016; Swann et al., 2012; Whitehouse et al., 2014); only two studies concentrate on the role of euphoric experiences (Kavanagh, Jong, Mckay, & Whitehouse, 2018; Newson, Buhrmester, & Whitehouse, 2016); these are discussed further in Section 2.2.2.3 and in Chapter 4.

Discussing these two forms of fusion is important because the DMR theory makes different predictions for fusion in imagistic (small) versus doctrinal (large) religious groups. Recall that the DMR theory proposes that individuals in imagistic religions bond via relational ties (i.e., local fusion), but that emotionally intense rituals in doctrinal religions should not facilitate bonding through the same mechanisms. While the size of many doctrinal religions (such as Pentecostal Christianity) would seem to rule out the possibility that members are aligned to the group via local fusion, it is possible that extended fusion could facilitate group alignment in doctrinal religions. Therefore, discussing the differences in the role of relational ties in fostering fusion can help us to better understand how emotionally intense rituals in doctrinal religions can affect one's alignment to a group.

2.2.2.1. Local Fusion

Local fusion is said to be based on the formation of kinship-like relational ties to non-kin. These ties are thought to be the result of a shared traumatic experience such as an initiation, war, or witnessing an act of violence or terrorism (Swann et al., 2012). Intense experiences can create episodic memories, which encode information about who was present during an event. In principle, the formation of long-lasting episodic memories for who was present at an intense event could

codify relational ties between people who experienced the event (as proposed by Whitehouse & Lanman, 2014). Insofar as the individuals do not forget who was present during the experience, they will always feel bonded to those individuals. However, recent research suggests a slight amendment. Some evidence suggests that individuals cannot accurately recall exactly who was present at intense religious rituals, but they are quite certain that they accurately recall exactly who was present (Xygalatas et al., 2013). Since memory becomes codified after the event, it could be said that individuals form relational ties with who they *believed to be present*, rather than who was actually present.

Given the size of doctrinal religions, it seems infeasible that local fusion is the form of group alignment operating in doctrinal religions because it would be logistically impossible for all members of many doctrinal religions (e.g., Pentecostal Christianity) to know one another. However, it is imaginable that imagistic practices in doctrinal religions can foster local fusion. For example, in the Melanesian religions discussed in Section 2.1, individuals in local communities who performed highly intense emotional rituals appeared to bond with the other members of their local community. It wasn't until these communities came together after the fact and realized they had all independently performed similar rituals that the experience became a basis for social cohesion outside of their local community. In addition, some Christian churches utilize bible study groups of 15 or so individuals that frequently meet (typically on a weekly basis). Should an emotionally intense experience happen within such a group, it could foster local fusion among the members of the bible study group, but not necessarily among other members of church who are not part of that group. These possibilities are discussed later in this chapter as well as in Chapter 4.

2.2.2.2. Extended Fusion

Given the size of most doctrinal religions, individuals that are fused to a doctrinal religious group such as Christianity would be said to be fused via extended fusion. As discussed in relation to local fusion, it is theoretically possible for small sub-communities within a doctrinal religion to be fused via local fusion. However, measurements of their levels of fusion to their larger church congregation (assuming the church is sufficiently large that they couldn't know all other members of the church) should be measuring extended fusion.

Extended fusion proposes that individuals who are fused to large groups are believed to view the members of their group as fictive kin (Swann et al., 2012). Triggering kinship perceptions may be why individuals with high levels of fusion are willing to fight and die for a large group of genetically unrelated individuals. Research suggests that extended fusion, like local fusion, also results from intense emotionally intense experiences (Buhrmester et al., 2014; Jong et al., 2016; Kavanagh et al., 2018; Swann et al., 2012). Currently, the fusion literature suggests that extended fusion can result from reflection upon an emotionally intense experience such as being affected by terrorism (Buhrmester et al., 2014; Jong et al., 2016) or participating in festivals (Páez et al., 2015). Whitehouse and Lanman suggest: "what will trigger psychological kinship is the perception that one shares with others episodic memories that are essential components of one's autobiographical self-concept" and they suggest this is because sharing such experiences has served as a reliable marker of genetic relatedness in our evolutionary past (2014, p. 677).

In most studies of fusion, fusion is treated as a mediator or predictor for some other effect, usually the extreme pro-group behaviours such as self-sacrifice (e.g., Besta, Szulc, & Jaśkiewicz, 2015; Newson et al., 2016; Swann, Buhrmester, et al., 2014; Swann, Gómez, et al., 2014; Swann, Gómez, Dovidio, Hart, & Jetten, 2010; Whitehouse et al., 2017b) or cooperation, particularly in

regards to the donation of goods or time (Buhrmester, Burnham, et al., 2018; Buhrmester et al., 2014; Gómez, Morales, et al., 2011; Newson et al., 2016; studies 4-6 in Whitehouse et al., 2017, 2014). In addition, most studies use surveys to address extended fusion in large groups like nationalities (e.g., Americans or Spaniards) and almost all studies of extended fusion are correlational. The lack of experimental evidence may be partially due to the ethical issues in facilitating an experimental condition with high enough arousal that would trigger the episodic memories currently thought to underpin fusion. Additionally, it is difficult to devise experimental protocols that are feasible for large groups (although, this is also an issue for the literature on social identification). Nevertheless, many studies have used survey questions and priming manipulations (e.g., Jong et al., 2016) to suggest potential causes of extended fusion. Of those studies that are currently published in the literature, there are a few that have anomalous results.

2.2.2.3. Issues concerning relational ties and essential beliefs in extended fusion

Theoretical overviews of the fusion literature propose that both local and extended fusion should be based on relational ties (Fredman et al., 2015, p. 472; Swann et al., 2012, p. 443). It is currently proposed that local fusion is based on actual relational ties between members of a group while extended fusion is when people "project the relational ties normally associated with local fusion onto large groups despite having little or no direct contact or shared experiences with individual members" (Swann et al., 2012, p. 443). It has been suggested that sharing essential beliefs with "other group members may allow for and enhance fusion with the group" (Swann et al., 2012, p. 449).[8] Swann, Buhrmester et al., state that, knowing essential beliefs "are shared may

[8] In the fusion literature, the terms *shared essence* and *core characteristics* are often used. Their definitions are extremely similar and for the sake of clarity, I use the term essential beliefs as the literature would suggest that essential beliefs are possible targets for perceived shared essences or core concepts. In this way, essential beliefs are a subset of shared essences or core characteristics (although some possible

reinforce the perception of familial ties to fellow group members, ties that encourage them to make extreme sacrifices for the group" (2014, p. 914) and the authors clarify that they "conceptualize perception of familial ties as a member of the larger class of relational ties" (2014, p. 914). This suggests that sharing some essential belief is able to foster extended fusion by activating perceived relational ties. However, while some studies have found evidence for the relationship between essential beliefs and fusion, other studies suggest that relational ties may not be the foundation of extended fusion (discussed below), suggesting the link between perceived essential beliefs, relational ties, and extended fusion may require greater specification.

A recent paper by Vázquez, Gómez & Swann (2017) presents three studies conducted in Spain that investigated the longitudinal effects of threats to one's group (in this case, Spaniards) on levels of identification, fusion, relational ties and categorical ties.[9] They utilized pre-test and post-test measures of these constructs over time. During the post-test of study 1, they manipulated the level of salience of perceived group threats by having participants read and write about different incidents they believed to be negatively impacting their identity (a scandal regarding the Spanish Monarchy). When analysing their data, the authors used a dual mediation model where pre-test fusion was the independent variable, post-test fusion was the dependent variable, and

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shared essences or core characteristics, such as race, might not qualify as essential beliefs). In the literature, *shared essences* are "qualities of a group that capture its very nature, without which the group would be fundamentally altered, and differentiate it from outgroups" (Buhrmester, Newson, et al., 2018, p. 5). Buhrmester et al., propose that shared essences can be "*symbolically represented* by physical objects, people, places, and events" (2018, p. 5; emphasis in origional) and are expanding on what Swann, Buhrmester et al., (2014), referred to as *core characteristics*.

[9] In the text, Vázquez, Gómez & Swann use the term "collective ties" but it is clear that this term is functionally equivalent to categorical ties. They state, "collective ties are based on sentiments toward the group category as a whole, independent of one's interpersonal relationships," (Vázquez et al., 2017, p. 481) citing Brewer & Gardner's (1996) seminal paper where the term categorical ties was outlined as the source for their definition.

levels of perceived relational ties and categorical ties served as independent mediators. This model revealed that the relationship between pre-test and post-test fusion was significantly mediated by categorical ties to the group but not relational ties to the group, suggesting that changes in extended fusion are related to categorical ties, which are currently thought to be the basis for identification (Whitehouse & Lanman, 2014, p. 678), but no evidence was found that changes in extended fusion were related to relational ties.

In addition, Vázquez, Gómez & Swann (Study 2; 2017) measured the level of fusion in a Spanish sample before and after a vote to have Catalonia secede from the rest of Spain. A confirmatory factor analysis found that the measures of fusion, relational, and categorical ties were all separate constructs. They found that extended fusion has a stronger correlation with categorical ties (r = .86) than relational ties (r = .73), suggesting that, while there is a relationship between extended fusion and relational ties, the relationship between fusion and categorical ties may be stronger. The results of study 1 were also replicated in Study 2: using a mediation model, they found that categorical ties partially mediated the relationship between pre-test and post-test fusion, but their measure of relational ties did not. Lastly, the authors manipulated when individuals would take the post-test (before or after an election) and found that the relationship between pre and post-test fusion was mediated by categorical ties but there was no significant indirect effect for relational ties (Vázquez et al., 2017; Study 3). Taken together, the results of these studies suggest that changes in extended fusion over time are related to categorical ties. While there was evidence of a correlation between relational ties and extended fusion, there was no evidence that relational ties mediated changes in extended fusion.

Another unexpected finding that concerns the relational ties principle was reported in a recent study of identification and fusion in large Brazilian groups, which found that “individual

self-stereotyping and ingroup homogeneity presented mid- to low positive correlations with identity fusion in all target groups" (Bortolini, Newson, Natividade, Vázquez, & Gómez, 2018, p. 16). As Bortolini et al., note, this is not predicted by fusion theory because the relational ties principle suggests that highly fused people should be "predisposed to recognize the unique personal identities as well as social identities of fellow group members, allowing for 'uniqueness-based' as well as 'membership-based' attraction" (Swann et al., 2012, p. 443).

Turning now to the relationship between extended fusion and essential beliefs, Buhrmester et al., (2018) investigated the relationship between fusion with one's country and essential beliefs. In one study reported in the paper (Study 2), they measured a participant's fusion with a country, the extent to which they held as an essential belief that baseball was part of America's "essence" and how much money they would allocate to an American baseball club, while taking money from a Cuban baseball club. The behavioural measure (of donating to an ingroup or deducting money from an outgroup) allowed them to assess the pro-group tendencies predicted by fusion. To assess essential beliefs, they asked participants to answer four questions: 1) "American baseball captures the very essence of the U.S."; 2) "Baseball lies that the core of what it means to be American."; 3) "Baseball represents the heart and soul of America."; and 4) "Baseball is an essential part of the U.S.A." Internal consistency on their measure of an essential belief was good ($\alpha = .91$).[10] Their analysis revealed a positive correlation between fusion and perceiving baseball as part of the nation's essence. The results further revealed main effects for fusion and essential belief, "indicating that as fusion and essence each increased, so too did the amount given to the ingroup"

[10] Cronbach's α (or Cronbach's alpha) is a statistic used to test for scale reliability. It measures the internal consistency between items in a measure (such as the individual likert scale responses in the multi-item measures of social identification presented later in this research).

(Buhrmester, Newson, et al., 2018, p. 21). A simple slopes analysis also revealed that, for those who do not believe baseball to be part of the nation's essence (as measured by those participants scoring less than 1 SD from the mean on the essential belief measure), fusion was not associated with donations to the ingroup or deducted from the outgroup. However, for those who did believe baseball to be part of the nation's essence (as measured by those participants scoring greater than 1 SD from the mean on essential belief measure), increased fusion was associated with greater donations to the ingroup and greater deductions from the outgroup.

An additional study by Páez et al., (2015; Study 3) deployed a survey among participants drawn from 15M protesters[11] in Spain to assess the effect of essential beliefs on fusion. Using a mediation regression model, their analysis revealed that the amount of participation in the movement was positively related to their endorsement of essential beliefs of the group (solidarity, freedom, dignity, participation, social justice, and equity) and that this relationship was positively mediated by their perceived emotional synchrony with the group. The fact that the results of the study by Páez et al., (2015), like the Buhrmester et al., (2018) study, found a relationship between essential beliefs and fusion suggests that in some cases, extended fusion may be the result of essential beliefs.

The results of these studies have not demonstrated that perceptions of essential beliefs trigger fusion via perceived relational ties (as the studies above do not investigate relational ties directly). While some studies have shown that perceived essential beliefs affect extended fusion, others have not found evidence that relational ties affect extended fusion, and no study to date has

[11] The 15M protest is similar in motivation to the "Occupy Wall Street" movement but started in May of 2011, a few months before the earliest gatherings of the "Occupy" protesters in New York's Financial District began in September (Páez et al., 2015, p. 10).

attempted to study essential beliefs in conjunction with relational ties. This leaves open the idea that perceived essential beliefs affect extended fusion without activating perceived relational ties, as posited previously by some fusion theorists (Swann et al., 2012; Vázquez, Gómez, Ordoñana, & Paredes, 2015); a variation of the claim that essential beliefs affect extended fusion without activating relational ties is advocated in the IIS framework described in the next section.

In addition, the fusion literature is unclear as to the role of emotional valence in creating fusion. While multiple theoretical overviews suggest that dysphoric experiences cause fusion (Swann et al., 2012; Whitehouse & Lanman, 2014) and say little about the role of euphoric experiences (as noted by Xygalatas, 2014), the empirical literature has found support that both dysphoric and euphoric experiences can result in fusion. Multiple studies have found links between fusion and dysphoric experiences including war (Whitehouse et al., 2014), initiation rituals (Whitehouse et al., 2017), and acts of terrorism (Buhrmester et al., 2014; Jong et al., 2016). To my knowledge, two studies have collected data on the positivity or euphoria of an experience and fusion. The first study was conducted with British football fans and found that the extent to which dysphoric experiences (such as when one's team loses) and euphoric experiences (such as when one's team wins) were considered to shape the way a participant sees his or her self were positively related to fusion to the football club. The second study recruited participants from Brazilian Ju Jitsu group found a positive relationship between the positivity they associated with belt promotion rituals and fusion to their Brazilian Ju Jitsu group. The results of these studies suggest that both positive *and* negative experiences can promote fusion. This is addressed further in Section 2.3.2 and Chapter 4.

In the next section, it is proposed that by understanding the role of emotionally intense experiences in formation of schemas in semantic memory we can better understand how essential

beliefs of a group can serve as a basis for extended fusion with doctrinal religious groups by internalizing social beliefs into one's personal schema. Furthermore, it is proposed that this can clarify the issues noted in this section regarding the relationship between essential beliefs and fusion.

2.3. The Information Identity System (IIS)

The IIS extends the DMR theory by revising several components that are proposed to promote social cohesion in doctrinal religions: frequency of in-group ritual attendance, emotional intensity of religious experiences, reflection on emotionally intense experiences, development of a personal schema, accessibility of relevant social schemas, and within-group consensus. This section outlines (1) how these aspects can be integrated into a single framework, (2) the key factors that enable the IIS to enhance the DMR by accounting for the persistence of practices that facilitate emotionally intense experiences in doctrinal religions, and (3) how the IIS can clarify some of the findings concerning the role of relational ties and essential beliefs in extended fusion described in the previous section.

The IIS, in extending the DMR theory, builds upon well-established aspects of human psychology. For example, the research on human memory, described in Section 2.1, has a considerable amount of empirical investigation going back over four decades. Additionally, since the 1980s social psychologists have published a great deal of empirical research concerning social identification. However, most of the fusion literature is more recent. The initial papers on fusion were published a decade ago (the first papers started to be published around 2009); and the first paper to incorporate the fusion literature with the DMR theory is extremely recent (Whitehouse & Lanman, 2014). Both the DMR theory and the IIS extension take a cognitive approach to the study of religion. The IIS focuses on what is called a computational approach, which focuses on how

information can be processed in the mind (see Rescorla, 2015). Specifically, it focuses on how information input by different religious experiences is processed by human cognitive mechanisms and results in schemas about our self and our group that can affect social cohesion over time. As such, the IIS is presenting an individual-level computational model that aims to address the proximate mechanisms of the evolution of doctrinal religions. The relationships between the key variables of the IIS' model are formalized in Figure 1, which presents a simplified model of the relationships.

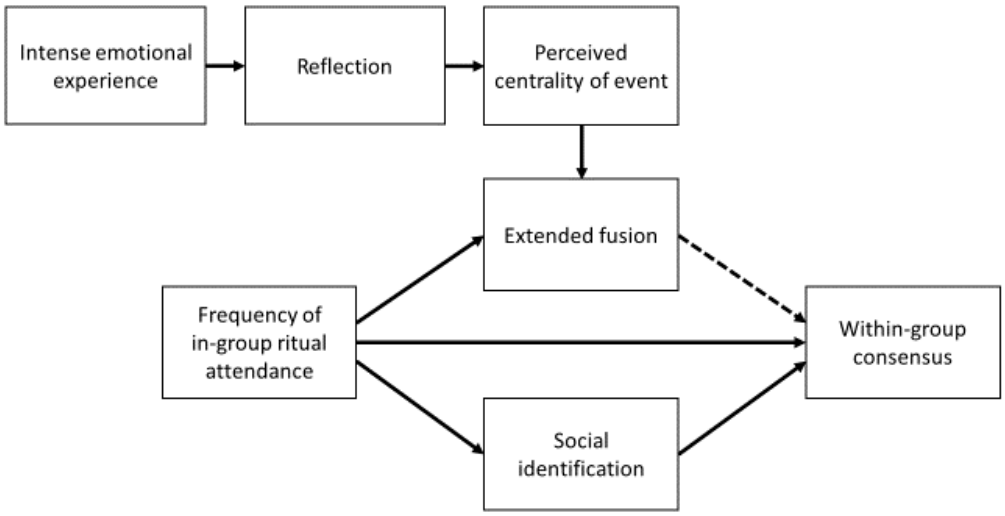


Figure 1. Proposed relationships of the IIS. Solid arrows depict hypothesized positive relationships. Dashed arrows depict hypothesized negative relationships.

The IIS begins by noting that the way individuals internalize information is critical to the formation of memory and the schemas that inform our identities and underlie within-group consensus. It also relies on the position that episodic memory and semantic memory are not separate systems, but they have overlapping attributes. Understanding these overlapping

attributes—and how they are related to personal and social schemas—can help us understand social cohesion in doctrinal religions. The IIS focuses on how two pathways affect the interactions of personal and social schemas and, therefore, group alignment styles. These two pathways start with frequency of in-group ritual attendance and intense emotional experience in Figure 1 above.

The IIS aligns with the DMR theory in accepting that semantic memories are formed by the rehearsal of information, and that frequent rituals can facilitate the required rehearsal to form semantic memories (as outlined in Section 2.1). It also aligns with the DMR theory in suggesting that rare and emotionally intense experiences, such as initiation rituals, can form episodic memories. However, it extends the DMR theory, which focuses on the ability of dysphoric arousal to form episodic memories, to state that both dysphoric and euphoric experiences can facilitate the formation of episodic memories. As such, the IIS focuses on the emotional intensity of a ritual, not the ritual's emotional valence, as the cause for fusion. Critically, the IIS posits that the distinction between personal and social schemas can be blurred when we interpret autobiographically relevant memories (such as those formed by emotionally intense experiences) using information from a group's social schema. Evidence suggests that autobiographically relevant episodic memories can be partially reconstructed using schemas in semantic memory and some semantic memories can be deeply personal and have emotional associations; typically, a feature of episodic—not semantic—memories (Renoult, Davidson, Palombo, Moscovitch, & Levine, 2012; Wilson & Ross, 2003). For example, for a devout Christian, the Crucifixion can evoke extremely emotional responses, even though they could not have directly experienced or perceived the event and they are unlikely to recall the details surrounding when they learned the information, suggesting that knowledge is stored in semantic memory.

The distinction between episodic and semantic memory is also blurred when episodic memories become semantic memories. It should be noted that, when information is first presented to us it would not be initially encoded in semantic memory. Using the standard example of learning the capital of France, when one is first told that Paris is the capital of France, we would have an episodic memory of being presented with this information (with details such as who told us this information and where we were when we learned it) and later, after the information is rehearsed through reflection or repeated exposures (or rote memorization), is the information consolidated into semantic memory. *Memory consolidation* is the process by which information perceived during a personal experience becomes a part of semantic memory. Consolidation theories propose that knowledge becomes incorporated into semantic memory through reactivation. There are three main theories of memory consolidation—namely, consolidation theory, semantization theory, and multiple trace theory. *Consolidation theory* proposes that reactivation of information during memory consolidation is an explicit process, but *Semantization theory* proposes that reactivation of information during memory consolidation is an implicit process (Meeter & Murre, 2004). *Multiple trace theory* does not clearly argue for either explicit or implicit reactivation of information; only that multiple traces of hippocampal activation are necessary to support episodic memories and as hippocampal traces are replaced by neocortical traces, the memories begin to resemble semantic memories and lose their episodic qualities (Moscovitch, Nadel, Winocur, Gilboa, & Rosenbaum, 2006). While these three theories disagree on the details of the process, they are all in agreement that repetitions (be they implicit or explicit) can serve to consolidate personal experiences (such as those stored as episodic memories) into semantic memory. They all commonly assert that, during the consolidation process, some episodic memories lose their vivid imagistic qualities and become incorporated into semantic schemas. As such, the current research

does not focus on a rigid distinction between these three approaches. Instead, it focuses on the general process of consolidation of information into schemas, primarily through two mechanisms of rehearsal that have been shown to be important in the literature: repeated experiences (such as frequent ritual attendance) and reflection (V. M. Holmes & McGregor, 2007; McFarlane & Humphreys, 2012; Svoboda & Levine, 2009; Xygalatas et al., 2013). These two mechanisms of rehearsal underlie the key differences between the two pathways of the IIS represented in Figure 1 above.

The first pathway in Figure 1 starts with frequency of in-group ritual attendance. As in the DMR theory, the IIS proposes that information that is repeated under conditions of low emotional intensity should eventually appear like semantic memories and be consolidated into schemas. These schemas can form one's understanding of an essentialized social category (a social schema). This essentialized social category, defined by a social schema, can then serve as the target of categorical ties. The position that semantic memory and social identity are connected has received previous empirical support (e.g., Berntsen & Rubin, 2006; Fivush, Habermas, Waters, & Zaman, 2011; Haslam, Jetten, Haslam, Pugliese, & Tonks, 2011; Prebble, Addis, & Tippett, 2012; this topic is discussed further in Chapter 5). In addition, it is important to note that, whereas the DMR theory focuses on the frequency that a ritual is performed, the IIS's extension to the theory focuses on the frequency with which an individual attends a ritual. While the literature discussing the DMR theory often implies that individuals are attending their group's rituals without fail (e.g., Whitehouse, 2004a), taking a more computational approach that focuses on the experiences of an individual is better served by focusing on the frequency of ritual attendance than how frequently the tradition might perform a ritual. As such, the information repeated as an individual frequently attends in-group rituals should serve to activate and codify the social schema on which their social identity

is based. In this way, the IIS posits a positive relationship between frequency of in-group ritual attendance and social identification.

Because different memory patterns affect group alignment (as discussed above), there should also be a relationship between group alignment and within-group consensus. The IIS proposes that, in principle, reflection upon semantic memories can result in new connections being made and new associations between concepts that were not previously related in a schema; however, insofar as frequent in-group ritual participation is high, most associations should lead to greater within-group consensus. For example, a Christian attending a sermon about the rules and teachings concerning servants in the Bible can connect the biblical rules and teachings to their own schema concerning how to deal with subordinate co-workers or maids in their home. In this way, tutored reflection on semantic memories can serve to recombine information held in other schemas. As such, frequent ritual participation that can serve to guide this reflection should result in higher consensus, even if there are dynamic changes in the social schema. Insofar as reflection results in changes to the content of a social schema, the IIS suggests that it can affect categorical ties and therefore social identification. This is because, if reflection results in new connections in a social schema, the information that the individual uses to define the group (held in the social schema) can become more—or less—able to foster a positive self-image and thus alignment to the group; this proposal is similar to earlier proposals in the social identity literature (e.g., Hogg & Turner, 1985; Verkuyten & Yildiz, 2007). That is to say, if changes to an individual's understanding of what their group represents are unable to foster a positive self-image, it should result in the individual no longer aligning with the group. Ultimately, the IIS and the DMR theory both propose that mutual ritual attendance (and therefore mutual encoding of information) should result in similar social schemas of information consolidated into the semantic memory of the members of

the group, resulting in high levels of within-group consensus. In this way, the IIS proposes a positive relationship between social identification and within-group consensus.

The other pathway in Figure 1 begins with emotionally intense experiences. The IIS approaches emotionally intense experiences in doctrinal religions by focusing on how memories for emotionally intense experiences can be consolidated through rehearsal mechanisms such as reflection. Effectively, the IIS agrees with the DMR theory that emotionally intense experiences foster reflection on the event (Berntsen, 2001; E. A. Holmes, Grey, & Young, 2005; Richert, Whitehouse, & Stewart, 2005) because its intensity and rarity can leave us searching for a way to interpret it (a claim which appears to be congruent with the fusion literature discussed in the previous section). In this way, the IIS proposes a positive relationship between emotional intensity and reflection on an experience.

The IIS makes specific predictions regarding the effects of reflection on consolidation in doctrinal religions. The predictions of the IIS hinge on whether there is a relevant social schema available for the interpretation of the emotionally intense experience. If there is no relevant social schema in place (as would typically be the case in imagistic religions—discussed in section 2.1), an emotionally intense episodic memory can be consolidated over time through rehearsal, and since that memory would encode information about who was present, it should lead to the formation of local fusion via relational ties (as is also predicted by the DMR theory). As such, the IIS holds that it is possible, in principle, that local fusion could result from relational ties between a subset of individuals codified from an episodic memory in an otherwise doctrinal tradition. However, because the relational ties underlying local fusion are between individuals who have a relationship, it is implausible that relational ties could connect individuals who are not in the same social network, making it a problematic explanation for fusion with a large doctrinal tradition.

Given that many doctrinal religions have expansive social schemas that are readily available to be employed to interpret to a wide range of circumstances, even if only by weak analogies, it is likely to be rare that there would be no social schema with which to interpret the event. When there is a relevant social schema for the interpretation of a high arousal experience in a doctrinal tradition, an individual can employ the schema during reflection to interpret the event, potentially creating links between the experience in one's personal schema and essential beliefs of a group's social schema. This results in the event becoming a central aspect of one's personal identity, while simultaneously being tied to an essential belief of the group's social schema. As such, the IIS proposes a positive relationship between reflection on an emotionally intense experience and the perceived centrality of the event.

As discussed in Chapter 1, the links between one's personal schema and essential beliefs in a social schema are called conceptual ties. Above, I have outlined how the IIS proposes that reflection on an emotionally intense event can result in the event being perceived as central to one's personal identity because one uses the group's social schema—and the group's essential beliefs—to interpret the event. This "overlap" between a central aspect of one's personal identity and essential beliefs of a social schema facilitated by conceptual ties is the basis for extended fusion within the IIS' framework. Therefore, the IIS proposes that there is a positive relationship between the perceived centrality of an event and extended fusion with a doctrinal religion.

There is evidence that suggests that one can incorporate information about external entities, such as essential beliefs, into own's personal identity. The idea was first discussed by William James (1890, Chapter 10). More recently, Aron, and colleagues expanded upon the idea to suggest that "cognitive representation of self and other might contain common elements or might occupy overlapping regions of a cognitive matrix, and access to them might follow similar pathways"

(Aron, Aron, Tudor, & Nelson, 1991, p. 243). Originally, this research addressed dyadic relationships between people, but later research found evidence that individuals sometimes incorporate aspects of a social group into how they see themselves (Mashek, Aron, & Boncimino, 2003). For example, Smith, Coats, & Walling (1999) utilized reaction time tests to study the extent to which individuals can correctly categorize information they find relevant to themselves as being congruent, or incongruent with a description of their in-group. They found that reaction times were faster when information about the in-group was congruent with information about their self. They take this to suggest that a participant's conception of self and in-group overlap.

The inclusion of concepts and beliefs into one's personal identity has been found to extend to concepts that are essential beliefs for doctrinal religions. Hodges et al., (2013) asked evangelical Christians and atheists to choose adjectives from a list that they believed pertained to themselves. They also asked them to choose adjectives from the same list that they believed pertained to God. They found that Evangelicals had a significantly higher percentage of terms that they believed applied to themselves and God (68.7%) as opposed to atheists (40.5%). In a second study in the same paper, Hodges et al., found that among Christians attending Presbyterian, Roman Catholic, Seventh-Day Adventist, and Foursquare Churches, the percentage of commonly held concepts believed to apply to one's self as well as God significantly predicted religiosity as well (Hodges et al., 2013; Study 2). Lastly, a study by Sharp, Rentfrow, & Gibson (2015) utilized the reaction-time protocol administered to self-identified Christians and found that individuals respond significantly faster on positively valenced terms related to their self in relation to God, Jesus, and the Holy Spirit. Although no correlates to religiosity levels were investigated in the Sharp et al., (2015) paper, the research nonetheless provides evidence that self-other overlap can extend to one's self and essential beliefs of a doctrinal religion.

To my knowledge, the only study that has used a measure of fusion to study an individual's fusion with a non-group entity has been published very recently and measured fusion to "Cecil the lion", among donors to the conservation research group that was studying the lion prior to its death (Buhrmester, Burnham, et al., 2018). Using the dynamic identity fusion index (Jimenez et al., 2015) to measure fusion, they found that fusion to Cecil the lion was a significant mediator in the relationship between the intensity of dysphoric arousal experienced by donors and their fusion to the research group. This suggests, that in some way, the relationship between an individual's personal identity and Cecil the lion was overlapping. This study is also discussed in further detail in Chapter 4. Taken together, these studies provide a basis for the IIS' claim that there is a relationship between centrality of an event and extended fusion as the result of conceptual ties.

The IIS, also in alignment with the DMR theory, proposes that emotionally intense rituals with low rehearsal and no available schema for interpreting the event should not result in the formation of shared schemas. However, emotionally intense experiences can foster reflection (Berntsen, 2001; E. A. Holmes et al., 2005; Richert et al., 2005), which can result in the consolidation of personally idiosyncratic beliefs. In addition, recall that the IIS proposes that, reflection can serve to make the experience central to one's personal identity by facilitating the creation of emotional associations between the memory for the experience in one's personal schema and essential beliefs in his/her social schema (i.e., a conceptual tie). While the rehearsal of information in a social schema during reflection on an emotionally intense experience could have a positive effect on within-group consensus, the resulting integration of one's personal schema and their social schema can introduce idiosyncrasies that should have a net negative effect on within-group consensus because the boundary between what is personal and what is social is

blurred. In this way, the IIS predicts a negative relationship between fusion with a doctrinal religion and within-group consensus.

To conclude, in proposing that personal and social schemas have different relationships depending on whether the individual is fused or identified, IIS predicts slightly different effects on within-group consensus and group alignment in doctrinal religions than the DMR theory. In identified individuals, because their social schema is largely derived from group beliefs without the interference of their own personal schema, their beliefs should appear more typical of the group at large; as such, within-group consensus should be high (as predicted by the DMR theory). However, individuals with high extended fusion have incorporated parts of their social schema into their personal schema through reflection, the boundary between personal and social beliefs is blurred and unorthodox connections between beliefs may be consolidated. Therefore, fusion, which is caused by reflection on an emotionally intense event that is subsequently considered central to one's identity, should have a slightly negative effect on their ability to reproduce the standard orthodoxy of the group, and thus within-group consensus.

2.3.1. Formalizing group alignment

The IIS presents an extension of the DMR theory that can be used to formalize both social identification and fusion, which in turn can help facilitate empirical research to test its claims. The personal and social schemas on which personal and social identities are reliant can be formalized as semantic network maps. A *semantic network map* is a collection of concepts, represented by nodes, which have links between related concepts. The links between concepts serve to add structure to the concepts and researchers have previously proposed that semantic network maps

are useful models of the cognitive structure of schemas (Carley, 1986; Carley & Kaufer, 1993).[12] In a semantic network map, the nodes representing concepts can have attributes, such as the term frequency, which is how often a concept appears in a dialogue, interview, or text (discussed further in Chapter 5 Section 5.5.2). For example, if we take the concepts presented in the "Lord's Prayer",[13] a prayer often recited by Christians on daily, or at least a weekly, basis, the nodes for "heaven" and "forgive" would have a term frequency attribute of 2 for each repetition of the prayer, as both words appear twice in the prayer. Likewise, links can also have attributes, representing information such as how frequently a link between two concepts appears. For example, the link between "hallowed" and "name" is represented once in the prayer, as such the link value could be 1. If the co-occurrence of the two terms were found more frequently, the link value could be increased to represent this difference. Semantic network maps also facilitate congruity with previous literature as they have been used by researchers to investigate aspects of within-group

[12] It should be noted that no claim is being made concerning the realism of these representations, they are only meant to be useful abstractions that can be efficiently represented and analysed using modern computational techniques. In addition, Carley notes that they are not as complete as other structures that represent schemas, such as frames, which represent schemas as a hierarchical set of interrelated definitions (Minsky, 1974, p. 1). As it was originally formulated, a frame organizes information into two levels: the first level holds information which is always true for the schema (axioms); and the second level includes places where information is held (called "terminals) as well as the constraints on what that information can take (called "markers"). The information in one frame can reference information in another frame. For example, a frame for the concept JESUS can reference the frame for the concept HUMAN. Furthermore, HUMAN will include information such as age, a quality which all instances of HUMAN possess. A semantic network map is more simplified, and can include some definitions, but not all. For example, if the idea that the concept HUMAN can be defined by a numerical age is not relevant to a specific application, this definitional aspect of HUMAN does not need to be included in the semantic network map.

[13] This prayer is frequently spoken by Christian communities. Many denominations recite it in unison on a weekly basis and others encourage or require it to be recited more frequently. The text for churches changes on tradition, but the version I refer to in this example is as follows: "Our Father who art in heaven, Hallowed be thy name. Thy kingdom come. Thy will be done, on earth as it is in heaven. Give us this day our daily bread, and forgive us our trespasses, as we forgive those who trespass against us, and lead us not into temptation, but deliver us from evil. For thine is the kingdom, and the power, and the glory, for ever and ever. Amen."

consensus (Carley, 1987; Hill & Carley, 1999) and doctrinal religions (Lane, 2015b; McCorkle & Lane, 2012; Whitehouse, Kahn, Hochberg, & Bryson, 2012).

Semantic network maps are also useful because they can be simplified to a two-dimensional matrix of numbers with identical lists of nodes (i.e., concepts) making up the x and y dimensions of the matrix and the value at the intersection of node x and node y representing the value for the link between term x and term y.[14] This mathematical formalization provides a means to compare multiple schemas for similarities between individuals within a group by analysing the extent to which the matrices contain values that represent similar relationships between concepts (discussed in Chapter 5). It can also allow for group schemas to be formalized (described in greater detail in Chapter 5 and Appendix 1).

When applying the semantic network maps to understand schemas, we can start by positing that the network representing a personal schema holds information such as personal beliefs, knowledge, ideas, experiences, accomplishments, etc. that are not socially shared. In the two-dimensional representation depicted below (Figure 2), the links represent a generic relationship between two representations.

[14] For those who are unfamiliar, this works in the same way as a multiplication table. You have some number on the top –for example, 5—and some number along the side—for example, 9—the value where column 5 and row 9 intersect holds the product of 5 and 9.

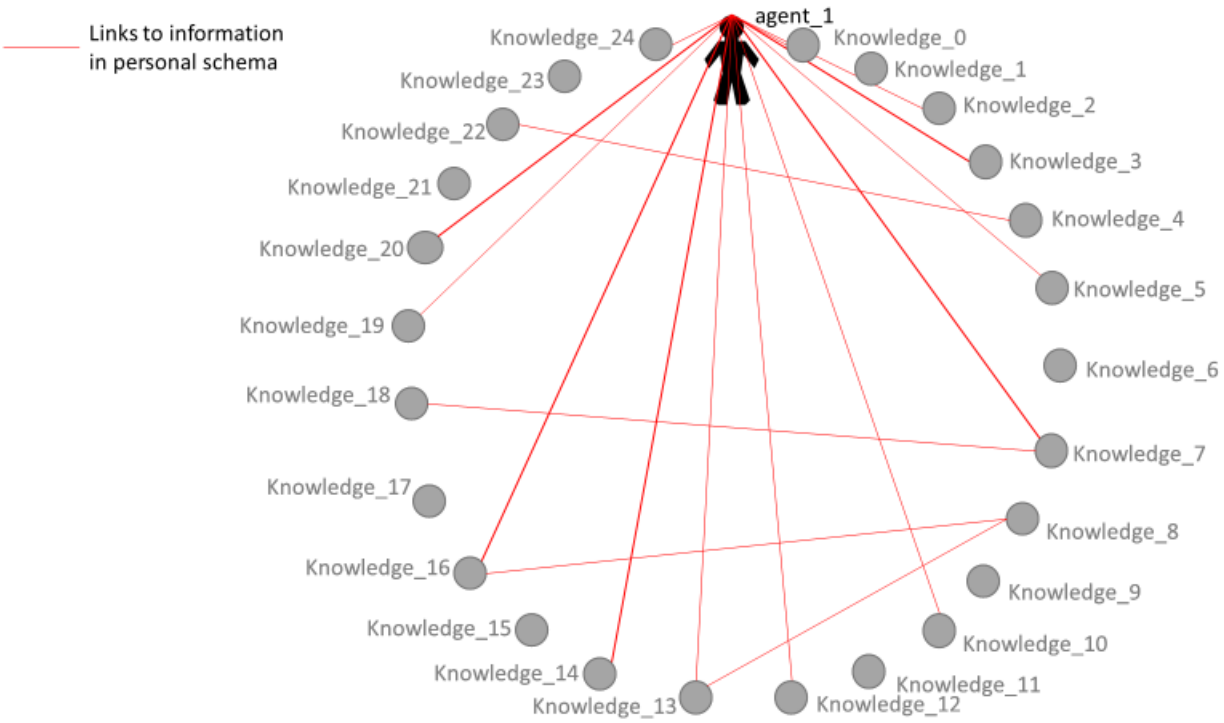


Figure 2. Network based representation of a personal schema. Depiction of an agent (the black figure) with ties to concepts (grey nodes). The solid red lines represent links between these representations.

In addition, a network representation of a social schema would look the same but depict the information representing the beliefs and links that some individual holds to be true about a particular social group. In principle, individuals could hold multiple social schemas, one for each group that they are knowledgeable about. One does not need to assume unique network topologies for semantic network maps that represent personal and social schemas. The key difference is that personal schemas should have links that are relevant to an individual, while social schemas will hold conceptual links that should be shared by members of a social group. Therefore, it would only be possible for the semantic network maps of a personal schema and a social schema to be identical if each member of the group has identical beliefs. To the extent that an individual identifies with a social category that shares that individual's beliefs, there should be similar links in the maps defining the personal schema and social schema of an individual who is strongly identified with the group as compared to an individual who is less strongly identified. However, in accordance

with the IIS's predictions regarding the formation of semantic memories, the social schema should not be connected to beliefs that are associated with high levels of emotionality, with the exception of conceptual ties that foster extended fusion.

Using this formalization, one can represent social identification as a categorical tie, which can be represented as a link between the individual and a meta-node. This *meta-node* is a single node that represents the network of information pertaining to the relevant group's social schema. A connection to a specific social category (defined by its meta-node) can be evoked in the relevant context to maintain a positive self-image in accordance with social identity theory. In this way, a link attribute can be used to represent one's strength of identification one has to the meta-node representing the social category. Furthermore, this formalization could reflect changes in how different beliefs can be viewed as more essential to the group's definition as the relevant beliefs could be added or changed in the network of the meta-node.

A visualization can be used to better describe how the IIS facilitates a careful formalization of extended fusion. Often, fusion is conceived of as two overlapping circles: one represents the individual and the other represents their social group. The more these two circles overlap, the more fused this individual is reported to be. However, instead of imagining two circles representing the personal self and the social group, we should imagine two networks; rather than one circle within another, there are now two networks that overlap. We can assume, that conceptual ties are those links in the personal schema that overlap with those held in the social schema and have a significant emotional attribute. Not all links need to be connected to the individual since we do not utilize all our knowledge to construct our identities; some information is just learned about our social group or information we know about the world, but the information is not directly relevant to our personal identity. A visualization of this is depicted below (Figure 3): blue dashed lines represent the

relevant connections to the beliefs in the social schema; solid red lines represent connections in their personal schema; dotted black lines represent conceptual ties that link both the individual's personal and social schema.

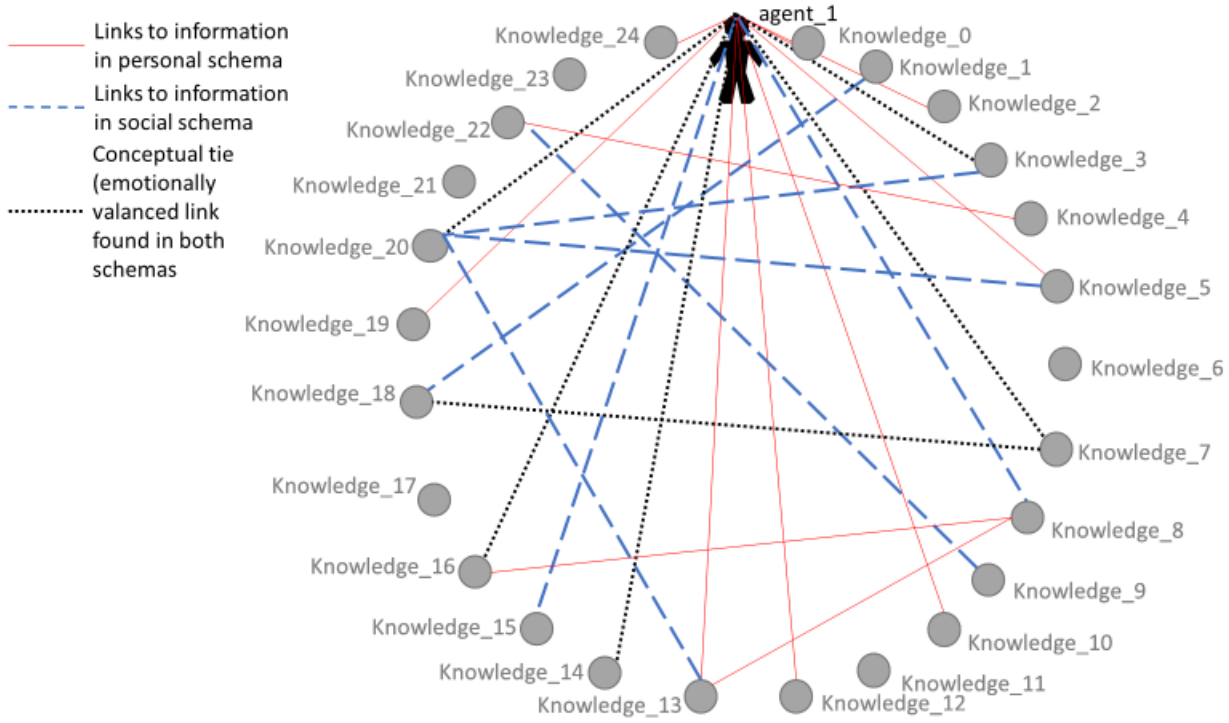


Figure 3. Visual depiction of schemas with conceptual ties. Depiction of an agent (the black figure) with ties to concepts (grey nodes). These concepts represent social and personal identity markers. Solid red links represent concepts relevant to the agent's personal identity. Dashed blue links represent concepts relevant to the agent's social identity. Dotted black links represent those beliefs from the social schema that have been incorporated into the individual's personal schema. Two relevant notes concerning this depiction: 1) this would be after reflection, whereby the individual incorporates personally salient information; 2) note the link between Knowledge_18 and Knowledge_7 does not directly connect to the agent. This could be the result of reflection upon two concepts whereby the information in Knowledge_18 is connected directly to the individual as well as to knowledge_7.

Relational ties (the basis for local fusion), on the other hand, can be represented outside of the semantic network map as social network links between individuals (the figures above only include one individual). These social network links could be modelled as fused by giving them an attribute representing a permanent emotional attribute that has a greater value attributed to it than other social network links. The critical differences between social identification and extended fusion then can be modelled: 1) extended fusion is facilitated by conceptual ties between the

personal schema and essential beliefs of one's social schema that become central to one's personal identity, whereas in the case of social identification, the links to a social schema are not central to one's personal identity; 2) social identification is facilitated by categorical ties that link an individual to a social schema that is associated with lower levels of emotionality—relative to conceptual ties.

2.3.2. Clarifying the effect of emotionally intense doctrinal rituals

In principle, the IIS can account for the four principles of fusion described above as well as clarify the role of relational ties in extended fusion noted in section 2.2.2.3 above. For a fused individual, any attack on a group that is defined by a set of essential beliefs that are also central components of one's personal self—would be largely indistinguishable from a personal attack. As such, a person would respond to attacks (physical or verbal) of their social group as if they were personal attacks. This can account for fusion's *agentic personal self principle*. In addition, because conceptual ties blur the boundary between the personal and social identities, individuals who are more fused are unable to dissociate themselves from the social groups because there is little functional difference between their social and personal schemas, accounting for fusion's *identity synergy principle*. The enduring effects described by fusion's *irrevocability principle* can be accounted for by the fact that the IIS predicts that the creation of conceptual ties is driven by reflection upon a personally salient and emotionally intense experience encoded as an episodic or flashbulb memory. The long-lasting nature of episodic memories could facilitate effects that result in fusion for as long as the individual feels that the event is a central part of their personal identity.

However, regarding the IIS's formalization's approach to fusion, the *relational ties principle* is not accounted for by conceptual ties. The IIS proposes that relational ties are the basis for local fusion (as discussed in theoretical overviews of the fusion literature presented by Fredman

et al., 2015; Swann et al., 2012; Whitehouse & Lanman, 2014) and are the result of episodic memories that encode relational ties as the presence of other individuals at a specific emotionally arousing event that is central to their personal identity, as in the case of imagistic religions that lack social schemas. In this way, the IIS outlines a critical distinction between local and extended fusion that has not appeared in the fusion literature to my knowledge, which is that local fusion is the result of relational ties and extended fusion is the result of conceptual ties. Therefore, we would not always expect that extended fusion be affected by changes in relational ties. However, we would expect to see observed relationships between extended fusion and essential beliefs (e.g., Buhrmester, Newson, et al., 2018; Swann, Buhrmester, et al., 2014) insofar as those essential beliefs are viewed as definitional for the group's social schema. In addition, the formalization above allows for the possibility that an individual, who identifies with a large doctrinal religion, could be fused to a subset of individual members in their group via relational ties, as relational and conceptual ties are not mutually exclusive of one another. As such, it is conceivable that an individual could be aligned to their group through extended fusion as well as aligned to a subset of the group's members through local fusion.

In addition to providing a framework to clarify the differences between local and extended fusion, the IIS approach to fusion enables us to re-examine some of the unexpected findings in the fusion literature. For example, the correlation between self-stereotyping and fusion reported by Bortolini et al., (2018) is compatible with the IIS, which predicts that extended fusion is the result of reflection that incorporates essential beliefs of a social schema into the personal schema (conceptual ties), but is at odds with the relational ties principle as stated in Swann et al., (2012). Therefore, one would expect that members of the group would be viewed as more like themselves because that which defines themselves as individuals also defines other members of their group

because they are perceived to share a commitment to an essential belief of the group's social schema. In addition, the studies cited in section 2.2.2.3 which failed to find a relationship between the fusion and relational ties (Vázquez et al., 2017) can be explained if the participants' fusion with their group was based in conceptual ties. This may be a plausible re-interpretation of the findings given that the groups that the research addressed were of a size that would suggest that their fusion would be extended, not local.

In addition to aligning with most of the DMR theory's predictions concerning ritual, memory, and social cohesion, the IIS offers new predictions that can address the emotionally intense ritual experiences that the DMR predicts should not persist in doctrinal religions (Whitehouse, 2004a), such as those common to Pentecostal and Charismatic Christianity. Using the formalization above, these key predictions can be tested using a wide variety of data, such as interview transcripts (discussed in Chapter 5) and online social network data (discussed in Chapter 6).

2.4. Cultural Epidemiology as an Alternative Explanation

Before discussing the hypotheses of the IIS that will be the focus of later chapters, an alternative explanation for how beliefs spread through social groups, known as cultural epidemiology, will be briefly discussed because it offers a plausible explanation for how social schemas spread and doctrinal religions maintain within-group consensus and two hypotheses derived from this theory are tested in Chapter 5. Generally, cultural epidemiology proposes that concepts spread through groups by means of social contact, like viruses; an approach first made famous by Richard Dawkins' (1976) idea of memes and later introduced into the field of anthropology by Sperber (1985).

Some theorists, such as Sperber and Hirschfeld (2006) propose that concepts spread from person to person, but they do not replicate like Dawkins' memes. Rather concepts are re-represented by each individual and conceptual stability is achieved because all humans are proposed to utilize similar cognitive mechanisms to process the information that is shared. In this way, some aspects of social learning are biologically grounded in cognitive modules (Sperber & Hirschfeld, 2004, 2006). Computational models that simulate information transmission using the modular approach (e.g., Bryson, 2013) have shown that within-group consensus is possible even given substantial amounts of "noise" when information is transmitted between agents. The results of analysing Bryson's model suggests that noise can also be suppressed due to the "probability of stumbling on" the correct cultural information presented by the majority of individuals from whom one socially learns (Bryson, 2013, p. 181). This suggests that the patterns of within-group consensus that we observe may be bolstered by the fact that we do not learn social schemas from just one individual in a linear transmission system like the game "telephone", but from observing and interacting with multiple people in our environment. In principle, high levels of within-group consensus could be achieved through inter-personal transmission, even though all members of a doctrinal religion do not know one another directly, if we assume that the social network of the religion constitutes a single component.[15]

In theory, since cultural epidemiology posits that information is learned from other individuals, it could form the basis of a social schema that serves as the basis for a social identity (this point would be compatible with the IIS and the DMR theory, although they focus on the role

[15] A network with a single component has at least one path connecting any two pairs of nodes (i.e., people) in the network. When visualized, it typically appears like a giant cluster that doesn't have any nodes (or clusters of nodes) that are disconnected from the main network.

of orators instead of fellow congregants to spread beliefs). However, addressing how an individual comes to use social schemas to align oneself to a group is beyond the scope of cultural epidemiology. As such, cultural epidemiology addresses social cohesion by describing how it is that within-group consensus concerning social schemas can develop in a group. One is left to assume that individuals could identify with a group using the social schema in ways consistent with the social identification literature.

In principle, cultural epidemiology's propositions can be tested using social network data drawn from naturally occurring groups. If the epidemiological approach is correct, then one should expect that the more individuals with which one communicates in a group, the more their beliefs should represent an average social schema for the group since more social ties would facilitate information input from a larger number of social individuals. This could, in effect, allow for the other members of the group to correct any idiosyncratic beliefs an individual might hold. Empirical evidence in support of this hypothesis would suggest that the social schemas with which we align ourselves are, at least in part, the result of our place in a social network. While this would not falsify the position of the IIS and the DMR theory, which states that social schemas are the result of frequent in-group ritual attendance, it would suggest an amendment to both the DMR theory and the IIS to include the role of individual social network links and communication patterns. Currently, neither the IIS or the DMR theory offer specific hypotheses concerning interpersonal communication in doctrinal religions beyond those related to local fusion.

2.5. Hypotheses

Having outlined the IIS in relation to the DMR theory and group alignment literature, I can present a number of predictions and testable hypotheses and elucidate the proximate mechanisms underlying social cohesion in doctrinal religious groups. In what follows, I focus on three

hypotheses that are central to the IIS and two alternative hypotheses that are drawn from the cultural epidemiology literature.

2.5.1. Hypothesis H1

The DMR theory and the IIS propose that frequent attendance at rituals with low emotional intensity is associated with social identification. The relationship between frequency of in-group ritual attendance and social identification should be significant even when controlling for fusion, which is posited to be based on relational ties—but the IIS proposes is due to conceptual ties (investigated in a later hypothesis H2b), since frequent in-group ritual attendance should result in the consolidation of the group's information into social schemas that can facilitate categorical ties. As such we can formalize the hypothesis below:

> H1- frequency of in-group ritual attendance is positively correlated with social identification when controlling for fusion.

This hypothesis was tested using survey data because surveys can be widely distributed and used to efficiently gather data in multiple locations. The survey was distributed online and directly to church congregations. The survey utilized established measures of social identification (the Postmes 4-item measure; found in Appendix 3.2) and fusion (the verbal fusion measure; found in Appendix 3.6). The survey also included self-report measures of how often they attend religious ritual services with their church as well as demographic questions. A full discussion of the survey and its questions are included in Chapter 3 and a copy of the paper survey can be found in Appendix 2.1 and the online version can be found in Appendix 2.2.

2.5.2. Hypotheses H2a & H2b

The IIS proposes that in doctrinal religions, reflection on an emotionally intense experience causes it to be viewed as a central event in one's life and creates fusion via conceptual ties. Testing this requires multiple relationships to be investigated because it has two potential mediators

(perceived frequency of reflection and perceived centrality of the event) and two potential targets of fusion (fusion to the group and fusion to an essential belief of the group). First, among those individuals who report having a deeply personal religious experience, the relationship between the reported emotional intensity associated with that experience and their level of fusion should be mediated by their perceived frequency of reflection upon the event and the perceived centrality of the event. Throughout the thesis, reflection refers to the "perceived frequency of reflection" because the measures of reflection employed in this research aim to capture significant periods of reflection, therefore self-report measures are used to measure how frequently participants perceive themselves to be reflecting (this is discussed in Chapter 4). In addition, because the IIS specifically predicts that extended fusion is the result of conceptual ties, two targets of fusion will be investigated: 1) fusion to the group and 2) fusion with an essential belief; namely, the concept "God" because it is a defining concept for Christian communities. Therefore, God serves as a reasonable target for a conceptual tie. It is likely that the concept of Jesus could also be a useful target concept for this analysis. However, the concept of God was chosen for this research because of deep rooted historical differences in theological understandings of Jesus among the different denominations and sects of Christianity. We can therefore formulate two related hypotheses:

> H2a- the relationship between the emotional intensity associated with an experience and fusion with a doctrinal religion is mediated positively by both a) the perceived frequency of reflection on the event and b) the perceived centrality of the event.
> H2b- the relationship between the emotional intensity associated with an experience and fusion with the concept God is mediated positively by both a) the perceived frequency of reflection on the event and b) the perceived centrality of the event.

To test these hypotheses, data were collected using surveys. Self-report measures were used to gather data on the emotional intensity associated with an intense religious or spiritual experience and how frequently participants believe that they reflect on that experience. The survey also

included measures of fusion to the group and to the concept God. Lastly, the survey used a measure called the "centrality of event scale" which was designed specifically measure the perceived centrality of an event. Testing this hypothesis can serve to provide new knowledge regarding how intense forms of group cohesion can be sustained in large doctrinal religions.

2.5.3. Hypothesis H3 and alternative hypotheses AH1 and AH2

Social cohesion does not solely rely upon the ability of groups of individuals to align with the same group. It also relies upon the ability for these individuals to sustain within-group consensus concerning the beliefs that define the group. The IIS aligns with the DMR theory in relation to the prediction that frequent in-group ritual attendance should encode the group's beliefs into social schemas. Therefore, there should be a positive relationship between frequency of in-group ritual attendance and within-group consensus. The IIS extends the DMR theory by proposing a positive relationship between social identification and within-group consensus because social identification is premised on a congruency between one's personal schema and the social schema of their group that fosters a positive self-image and is the result of learning social information over time in frequent rituals with low emotional intensity. Lastly, the IIS proposes that extended fusion is the result of conceptual ties (essential beliefs from the group's social schema becoming incorporated into one's own personal schema via reflection). In principle, the blurring between the personal schema and social schema can introduce personally idiosyncratic beliefs into their social schema. Therefore, extended fusion should have a negative relationship with within-group consensus when questioned about their group's social schema (i.e., extended fusion should have a negative relationship to within-group consensus). These factors allow us to put forward several empirically testable relationships. First, frequency of in-group ritual attendance should correlate positively with within-group consensus. Second, social identification should correlate positively

with within-group consensus. Lastly, a participant's level of fusion should correlate negatively with within-group consensus can be investigated. These relationships can all be tested as a single structural equation model, formalized in the following hypothesis:

> H3- The relationship between frequency of in-group ritual attendance and within-group consensus is mediated a) positively by social identification and b) negatively by fusion.

This hypothesis was tested using surveys in conjunction with semi-structured interviews. As with the previous hypotheses, survey-based psychometrically-validated measures of fusion and social identification were used alongside self-report measures of frequency of in-group ritual attendance. To asses within-group consensus, participants also completed a semi-structured interview, which was designed to ask them about the meaning and significance that their group attributes to collective ritual actions. In this case, since the research was performed with Christians, the interview focused on the Sunday Service as its target ritual. The transcripts of the semi-structured interviews were analysed via text mining algorithms that created semantic network maps. These maps were taken as approximations of a participant's schema and facilitated statistical testing for within-group and between-individual consensus. This technique is described in greater detail in Chapter 5 as well as in Appendix 1.

As discussed in Section 2.4, cultural epidemiology also offers a potential explanation for within-group consensus. Therefore, I test two interpretations of the claim that within-group consensus develops by epidemiological processes. The first alternative hypothesis, inspired by the analysis of the computer model presented by Bryson (2013) and the field research of Atran et al., (2002), investigated whether individuals with more connections in the group have greater within-group consensus because they are more likely to be exposed to the information that constitutes the group's social schema. The second interpretation tested whether individuals that have a recorded

social relationship have more similar beliefs than those that do not have a recorded social relationship. Stated specifically, the alternative hypotheses (AH) are:

> AH1 - there is a positive correlation between one's total network degree[16] and their within-group consensus.
> AH2- there is greater between-individual consensus with those individuals that a participant is connected to than those with which there is no connection.

To test the hypotheses, social network data was collected from participants during the semi-structured interview. Participants were asked to name people in their group with whom they regularly speak. This facilitated the creation of an approximate social network of the group. This network allowed me to investigate if cultural epidemiology provides a plausible explanation for within-group consensus.

In the next three chapters, I present studies that test the hypotheses outlined above.

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[16] In the literature on network analysis and graph theory, this is typically called "total degree centrality" or "degree centrality". However, because this research uses the term "centrality" to refer to the psychological phenomenon of incorporating an event into their personal identity, I refer to network measures of how many links an individual has as "total network degree" to avoid confusion.

3. Frequency of In-Group Ritual Attendance and Social Identification

The DMR theory and IIS suggest that doctrinal religions such as Christianity generally rely on frequent rituals to spread orthodox teachings. The information presented during these rituals is proposed to be consolidated into social schemas that can facilitate social identification if the beliefs are congruent with their own and support a positive self-image. As such, it has been proposed that doctrinal religions primarily rely upon frequent low arousal rituals to spread the beliefs that define the group as a social category, and this facilitates one's alignment with the group. However, most of the fusion literature agrees that, in the case of extended fusion, group alignment is based on perceived relational ties extended to other members of their social group that result from emotionally intense experiences (see Fredman et al., 2015; Swann et al., 2012; and Section 2.2.2). This distinction is important because the DMR theory suggests that emotionally intense rituals are not generally an aspect of doctrinal religions, while the IIS extension to the theory suggests that emotionally intense rituals result in extended fusion in doctrinal religions.

This chapter examines whether there is a positive relationship between social identification and frequent in-group ritual attendance when controlling for fusion. If such a relationship cannot be discerned, one could not reject the claim that ritual attendance in doctrinal religions fosters group alignment via fusion alone. This leaves open the possibility that fusion, either instead of or in addition to social identification, is a basis for group alignment with doctrinal religions. In principle, this could be the case if 1) fusion is not the result of relational ties (as suggested in Fredman et al., 2015; Gómez, Brooks, et al., 2011; Swann et al., 2012) but is the result of conceptual ties (as suggested by the IIS) or 2) large groups are not singular entities but are

collections of many smaller communities bound by relational ties (i.e., local fusion) embedded within what appears to be a single group. It should be noted that the latter proposal is not the explanation offered by either the IIS or DMR and evidence for the claim would suggest the need for theoretical revision of the DMR theory and the IIS.

Both social identification and fusion are potential pathways to group alignment with large groups such as doctrinal religions. Not only is this the case theoretically, but also empirically as a number of studies report high correlation between identification and fusion that often use nationalities as their target for fusion (e.g., Buhrmester et al., 2014; Buhrmester, Newson, et al., 2018; Jong et al., 2016; Swann et al., 2010, 2012; Vázquez et al., 2017). Therefore, clarifying the role of social identification—separate from that of fusion—in group alignment with doctrinal religions can help create a clearer understanding of the mechanisms of group alignment in doctrinal religions.

In this chapter, a discussion of the previous research is presented which suggests a relationship between frequency of in-group ritual attendance and social identification. In addition, a cross-cultural study is presented. The study used surveys with established measures of social identification and fusion along with self-report measures of the participants' frequency of in-group ritual attendance to test hypothesis H1: that frequency of in-group ritual attendance is positively correlated with social identification when controlling for fusion. The results of this study can provide evidence for the DMR theory's prediction that social identification is a critical mechanism for group alignment in doctrinal religions.

3.1. Previous Research

Several studies support the claim that attending events of a large group such as a doctrinal religion increases the strength of one's social identification to the group. Greenfield and Marks

(Greenfield & Marks, 2007) examined the relationships among social identification, religious service attendance, and subjective well-being in a sample of middle-aged Americans (N = 3,032). Their measure of social identification was a single item scale that examined how individuals identified with their group rather than with other individuals or specific beliefs of their group. As such, this measure seems more compatible with other measures of social identification than fusion. Regression analyses revealed that frequency of in-group ritual attendance had a significant, and positive effect on the strength of religious social identification (β = .70, $p \leq .001$). However, this study was limited as it was unable to tell us to what extent ritual attendance is related to social identification *per se*, rather than a mixture of social identification and fusion. Considering the United States has a wide variety of church liturgies ranging from small family churches to charismatic mega-churches, this study is unable to discern the extent to which social identification is the primary driver of group alignment and not fusion, or a combination of both social identification and fusion.

Similarly, Cheung and Li (2011) investigated the relationship between participation in national carnivals and identification in a large sample of 7th to 9th grade students in Hong Kong (N = 1,788). The national carnivals are annual festivals with many ritualized aspects, such as flag raising ceremonies and song and dance performances (for a greater discussion of the "ritualized" aspects of the events see Cheung & Li, 2011, pp. 1487–1489). To measure national identity, they utilized a 5-point scale that was intended to capture categorical identification. Their analysis utilized a structural equation model and found that those who had participated in ritualized events had more positive ratings of national identity. However, there was a negative interaction effect for individuals who previously had high national identity ratings, where the effect was the opposite for individuals with previously high national identification compared to individuals who initially

had lower ratings of national identification. One limitation of Cheung and Li's research is that the identity measure was never validated against pre-existing measures of social identification and the authors suggest that it was recording aspects of both national identification and nationalistic sentiment, which they believe to be two different phenomena (Cheung & Li, 2011, p. 1494). It is possible that national identification and nationalistic sentiment are related to social identification and fusion, respectively. In principle, social identification is rooted in semantic memories for the beliefs of one's group, which should not be associated with high emotionality regarding the information in the social schema stored in semantic memory. However, nationalistic sentiment has an implicit emotional component, which is associated with episodic memories; the authors describe sentiment as being comprised of "pride, favour, and support for China" (Cheung & Li, 2011, p. 1494). As discussed in Chapter 2, Section 2.2.2, episodic memories have been proposed as the foundation for fusion, a claim which has received recent empirical support (e.g., Jong et al., 2016). If Cheung and Li's measure of group alignment captures both social identification and fusion, this is a problem for our understanding of group alignment with large imagined communities as a function of social identification *per se*. This is because, given the studies noted above that have found consistent correlations between fusion and social identification, those individuals who have high levels of fusion also tend to have higher levels of social identification. Without measuring both social identification and fusion so that fusion can be controlled for statistically, one cannot rule out the possibility that fusion is just as related to ritual attendance as social identification.

The possible conflation of social identification and fusion in Cheung and Li's measurement may explain why they found that there was a negative identification effect after participation among individuals who initially reported high identification. It is possible that those with

previously high national identification were fused as well as socially identified. Since individuals who are fused tend to stay fused, as posited by the irrevocability principle and empirical data looking at fusion over time (e.g., Buhrmester, Burnham, et al., 2018; Páez et al., 2015), it would make sense that individuals who are fused would not be as affected by subsequent experiences as those who were not. Furthermore, recent research has shown that participation in festival actions leads to significant increases in fusion by means of perceived emotional synchrony with co-participants (Páez et al., 2015). Although, in principle, social identification should increase after participation, it is conceivable that individuals who were already fused would not report significant increases in identification. Given the fusion literature, the results found by Cheung and Li would be less surprising if a subset of the sample were already fused to their national identities. Cheung and Li's measure were unable to capture this potential effect. I propose that measuring a participant's level of fusion in conjunction with their level of social identification can clarify similar findings in future research.

A recent empirical study by Khan et al., (2015) also demonstrated that ritual attendance is associated with an increase in social identification. The researchers utilized a sample of 543 individuals, 416 of which attended a Hindu ritual where individuals participate in several activities over the course of one month (a ritual called the Magh Mela), the rest of the participants were utilized as a control group and did not attend any of the ritual activities. The participants were given an identification measure devised by the researchers at separate three time-points: before, during and after the ritual. It was found that those who attended the ritual reported greater identification after the ritual than before the ritual. There was no similar effect observed among participants in the control group. This study has several limitations that can be addressed. First, the researchers note that the Magh Mela ritual has many festival aspects over the month-long

period, but these are subdued versions of the full ritual festival, which are performed once every 12 years. Such an infrequent experience associated with the sensory pageantry of a duodecennial ritual should encode information via episodic—rather than semantic—memory. Therefore, the frequency and emotional intensity of the Magh Mela ritual are more suggestive of the imagistic mode. The IIS suggests that the Magh Mela should result in fusion; either via relational ties encoded by episodic memories or conceptual ties consolidated into semantic memory via reflection—depending on the greater context and viability of a relevant social schema (as discussed in Chapter 2, Section 2.3). In any case, neither the DMR theory nor the IIS would predict that the ritual would foster categorical ties leading to social identification. However, as with several of the previous studies, fusion was not explicitly measured by Khan et al., (2015).

Although the previous studies were able to add to our understanding of how ritual affects social identification, there are still questions that remain unaddressed. For example, one important limitation of several of the studies noted above was not investigating the role of extended fusion in group alignment. The present study addresses these limitations by deploying the verbal fusion scale (Gómez, Brooks, et al., 2011) along with a measure of social identification (Postmes et al., 2005). In addition, the ritual that is targeted by the research should be more frequent and have less emotional intensity than rituals like the Magh Mela in order to better understand the typical arrangement of rituals in doctrinal religions.

3.2. Methods

The study tests the hypothesis (H1) that frequency of in-group ritual attendance is positively correlated with social identification when controlling for fusion. This study was run as part of a collaboration between the University of Oxford, the National University of Singapore, University of Otago, and the State University of New York at Binghamton. Data were collected

over multiple waves between 2013 and 2014 in conjunction with the Singapore Religion and Spirituality Project (SRSP).[17] The data set consisted of responses to the survey that was distributed to Christians in the U.S., U.K., India, New Zealand, and Singapore; these locations where chosen because (1) churches in these countries have a wide variety of ritual practices, (2) these countries all have significant English speaking populations (allowing for measures previously designed and validated in English speaking populations to be deployed with greater confidence), and (3) the churches were open to the research where the surveys were distributed directly to a congregation. The surveys were distributed either directly to church members, on Amazon's Mechanical Turk (Amazon.com, 2015), or via Qualtrics' participant pool (Qualtrics Research Suite, 2013). A copy of the survey material distributed directly to the churches can be found in Appendix 2.1 and a copy of the survey material distributed online can be found in Appendix 2.2. Those individuals who answered yes to having had a significant religious or spiritual experience were asked to answer additional questions about that experience. A subset of the sample, recruited from two churches in Singapore, were asked to participate in a semi-structured interview about the practices and beliefs of their church during a typical Sunday Service as part of an additional study (discussed in Chapter 5). Data was analysed using the R-statistics software (R Core Team, 2014).

[17] The SRSP was funded by a generous small grant from the John Templeton Foundation as part of the grant: "Religion's Impact on Human Life: Integrating Proximate and Ultimate Perspectives" (Grant 37624). All surveys in this research were part of this grant. The survey discussed here was developed for use by the SRSP, Oxford Religion and Spirituality Project, and Binghamton Religion and Spirituality Project. The surveys included additional questions not discussed in this research as they were aimed at addressing questions of value to other collaborators and are not pertinent to this research. This includes questions concerning the strength of participants' religious beliefs, how regularly the participants pray, read the bible, and talk about their religious beliefs, as well as measures of socio-economic status.

3.2.1. Participants

Initially, the sample of participants (*N* = 2,538; *Mean age* = 40.18; *SD* = 15.42) included participants from 21 countries with a wide variety of ages and ethnic backgrounds. Most participants came from the target countries of Singapore (*N* = 770; 52.7% male; *Mean age* = 38.08; *SD* = 12.89), the United States (*N* = 520; 39.2% male; *Mean age* = 49.93; *SD* = 19.33), India (*N* = 342; 67.8% male; *Mean age* = 29.44; *SD* = 8.02), United Kingdom (UK; *N* = 852; 48.5% male; *Mean age* = 42.02; *SD* = 14.21), New Zealand (*N* = 29; 48.3%; *Mean age* = 53.19; *SD* = 17.63), and additional 26 participants came from all other countries but were removed from the analysis as they were not the target of this research and their sample sizes were too small to facilitate analyses. In addition, incomplete or partial responses were removed from the analysis, resulting in a final sample size of *N* = 2,074. The sample was 45% white, 36.1% Asian, 5.8% black, and 5.7 % Indian; no other ethnic group represented more than 5% of the sample.

3.2.2. Measures

The three variables required to test hypothesis H1 are *frequency of in-group ritual attendance*, *social identification*, and *fusion*. The target group was the participant's church, rather than any subgroup therein (such as a ministry) or any larger religious body (such as their denomination or the church as a global entity).

Data on frequency of in-group ritual attendance were collected using a 9-point ordinal scale that asked participants to indicate how often they "attend regular worship services at their church (e.g., Sunday Services, Daily Prayer)". Response options were 0-Never; 1-less than once a year; 2-about once a year; 3-several times a year; 4-about once a month; 5-several times a month; 6-about once a week; 7-several times a week; 8-daily.

To measure social identification, the present research employed the Postmes 4-item social identification scale (Postmes et al., 2005), which uses a 7-point Likert scale anchored at strongly disagree and strongly agree. This was chosen over alternatives because it is short, uses clear language, and is a multi-item measure, making it useful for cross-cultural research than single item social identification measures (e.g., Postmes, Haslam, & Jans, 2012) since the possible misinterpretation of any one item in the measure will have less of an effect on the participants final social identification score. An example of the Postmes 4-item scale and other alternative social identification scales can be found in Appendix 3 along with a discussion of their merits for cross-cultural research.

Two measures of fusion were used: the verbal fusion scale and the pictorial fusion scale. The verbal fusion scale is a 7-item measure prompting participants to answer on a 7-point Likert scale anchored at strongly disagree and strongly agree. Examples of prompts include "I am one with my group," "my group is me," and "I feel immersed in my in-group" (the full scale can be found in Appendix 3.6). The pictorial fusion scale is an adaptation of the inclusion of self in other scale that presents participants with two circles (one representing their "self" and one for their "group") that increasingly overlap in five successive stages and asks participants to select one of the five (Appendix 3.6). However, the pictorial fusion measure was not used in the analysis as the verbal fusion scale was shown to have greater validity in studies published after the data were collected (Jimenez et al., 2015).

3.3. Results

The distribution of social identification responses was skewed toward higher levels of identification (M = 5.14; SD = 1.27; *skewness* = -.67; *kurtosis* = .60) and responses showed high consistency (α = .94). The distribution of fusion scores had a tendency toward the middle of the

measure (M = 3.99; SD = 1.15; s*kewness* = -.34; *kurtosis* = .08) and responses showed high consistency (α = .93). An analysis of the frequency of in-group ritual attendance responses revealed that most participants attend church events weekly or several times a month (*median response* = "6 - About once a week").

Before running the linear regression with the entire sample, a check was run to discern any between group differences that would suggest that country should be added as a control variable to the analysis. A Kruskal-Wallis rank sum test revealed significant differences between countries on measures of social identification (H = 135.46, df = 4, $p < .01$), fusion (H = 290.3, df = 4, $p < .01$), and frequency of in-group ritual attendance (H = 326.86, df = 4, $p < .01$). Means and standard deviations by country are included in Table 3 below. Post-hoc analyses of the between groups differences for each variable are included in Appendix 4.1

Table 3

Means and standard deviations for social identification, fusion, and frequency of in-group ritual attendance by country.

Country	Social identification		Fusion		Frequency of in-group ritual attendance	
	M	*SD*	*M*	*SD*	*M*	*SD*
US	5.46	1.22	4.12	1.19	6.29	1.53
UK	4.80	1.41	3.44	1.14	4.45	2.16
Singapore	5.15	1.20	4.00	1.09	5.44	1.86
India	5.66	0.96	4.66	0.80	6.28	1.58
New Zealand	4.91	0.98	3.23	1.02	6.08	1.02

Three multiple regression models were investigated using the "Robust" R package (Wang et al., 2017), which was used due the violation of normality assumption for standard linear regressions (Yohai, Stahel, & Zamar, 1991). Model 1 tested for a relationship between frequency of ingroup attendance and social identification. Model 2 added responses from the verbal fusion

scale as a statistical control. Due to the unexpected significant differences found between countries (reported above), Model 3 added country to the model. All coefficients and significance values are reported in Table 4 below.

Model 1 revealed a significant relationship between frequency of in-group ritual attendance and social identification. Model 2, which added fusion as a control, predicted social identification better than Model 1 ($F_{(1,2071)} = 1963.60$, $p < .01$).

Fusion and frequency of in-group ritual attendance were found to have significant effects on social identification; however, country of residence was not identified as a significant variable (see Model 3 in Table 4). This result suggests that, although there are between country differences regarding social identification, fusion, and frequency of in-group ritual attendance, these differences did not significantly impact the relationship of frequency of in-group ritual attendance and fusion on social identification.

Table 4

Results of hierarchical linear models with social identification as the dependent variable and independent variables of frequency of in-group ritual attendance (Model 1), frequency of in-group ritual attendance and fusion (Model 2), and frequency of in-group ritual attendance, fusion, and country (Model 3).

Model	Predictor	B	SE B	ß	*t*	*p*	R^2	ΔR^2	*Wald*	*p*
1							.34	.34		
	(Intercept)	3.22	0.08	0.04	40.6	< .01				
	Frequency	0.36	0.01	0.56	27.3	< .01				
2							.66	.32	1558.7	< .01
	(Intercept)	1.61	0.07	0.01	21.9	< .01				
	Frequency	0.14	0.01	0.22	13.4	< .01				
	Fusion	0.72	0.02	0.66	39.5	< .01				
3							.66	.00	.7	.4
	(Intercept)	1.64	0.08	0.01	20.41	< .01				
	Country	-0.001	.002	-0.01	-0.84	.4				
	Frequency	0.14	.01	0.22	13.18	< .01				
	Fusion	0.72	.02	0.66	39.34	< .01				

Note: Frequency of in-group ritual attendance is shortened in the table to "Frequency" for succinctness.

Tests to validate the assumptions of linear regression revealed that the regressions in Models 2 and 3 failed the test for heteroscedasticity—suggesting that there may be an interaction between frequency of in-group ritual attendance and fusion. Therefore, an interaction between frequency of in-group ritual attendance and fusion was added to Model 2. Indeed, a significant interaction was found, and including the interaction term (Model 3I; see Table 5) explained significantly more variance than the model without the interaction term (Model 2; see Table 5); however, as reported in Table 5, the increase in R^2 was 0.02.

Table 5

Regression results of interaction model (3I). Model 3I has the dependent variable of social identification and independent variables of frequency of in-group ritual attendance and fusion and also adds the interaction of frequency and fusion into Model 2.

Model	Predictor	B	SE B	ß	*t*	*p*	*R*	*Δ* R^2	*Wald*	*p*
3I							0.68	.02	46.1	<.01
	(Intercept)	0.69	0.17	0.01	4.08	< .01				
	Frequency	0.32	0.03	0.49	10.64	< .01				
	Fusion	0.99	0.02	0.91	21.81	< .01				
	Frequency* Fusion	-0.05	0.01	-0.45	-6.79	< .01				

Note: Frequency of in-group ritual attendance is shortened in the table to "Frequency" for succinctness.

This significant interaction found in Model 3I suggests that frequency of in-group ritual attendance and fusion not only have their own independent effects on social identification, but frequency of in-group ritual attendance and fusion also have a combined effect. To better understand this interaction, a simple slopes analysis was run, which can help to elucidate the nature of the interaction and give a better description of the interaction between frequency of in-group ritual attendance and fusion.

The results of a simple slopes analysis (Figure 4) revealed that frequency of in-group ritual attendance had a stronger positive effect on social identification for individuals with low fusion (those individuals who had scores less than 1 SD from the mean of all fusion scores) than it did for individuals who had high levels of fusion (those individuals who had scores greater than 1 SD from the mean of all fusion scores). This suggests that there is a positive relationship between social identification and fusion, but that this relationship is not as robust for highly-fused individuals.

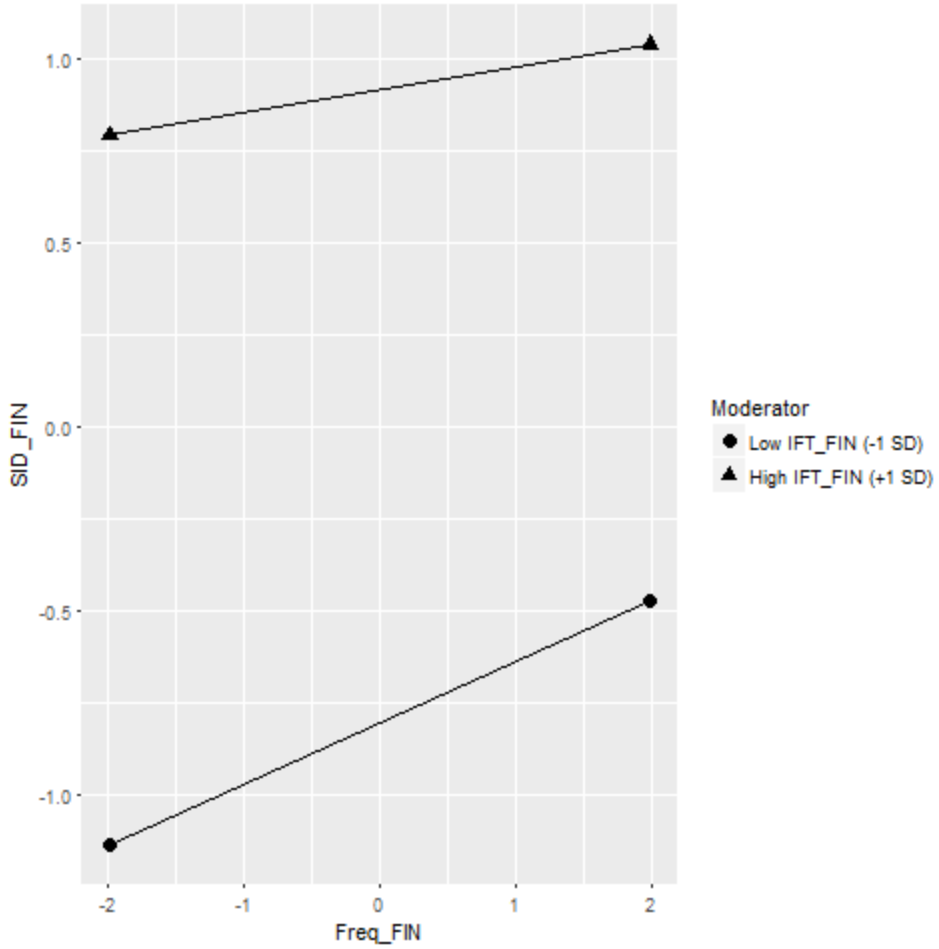


Figure 4. A plot of the simple slopes analysis revealing the interaction effects between fusion and frequency of in-group ritual attendance on social identification. The plot demonstrates how the effect of frequency of in-group ritual attendance on social identification was greater for low fusion participants than for high fusion participants.

Post hoc power analysis revealed that the study achieved acceptable power (*power* = 1 assuming a significance level of .05 and effect size of .34 given the number of predictors and sample size collected in the study). Power analysis was calculated using the software G*Power (Faul, Erdfelder, Lang, & Buchner, 2007).

3.4. Discussion

This study found evidence that there is a positive relationship between frequency of in-group ritual attendance in a doctrinal religion and one's strength of identification with their group. The large cross-cultural sample used in this study suggests that this relationship is observable in

many regions of the world, although the levels of frequency of in-group ritual attendance, fusion, and social identification appear to differ without clear patterning between cultures. However, the results also show that this relationship is not as simple as often described.

First, the effect of fusion was greater than expected since the IIS and the DMR theory posit that the frequent ritual experiences that typify doctrinal religions should result in social identification, not fusion. In addition, the result that frequency of in-group ritual attendance had a limited effect was surprising; although the IIS proposes that fusion can be a significant aspect of group alignment in doctrinal religions, it agreed with the DMR in suggesting that social identification would be the clear primary mechanism of group alignment in doctrinal religions. It is important to note here that the small effect of frequency of in-group ritual attendance is unlikely to be due to issues of collinearity, as $VIF = 1.38$. Typically, values less than 4, even in weak models, are considered acceptable (O'Brien, 2007). Given the discussion presented in Chapter 2, the large effect of fusion in doctrinal religions is theoretically problematic, as doctrinal religions are posited to rely on social identification that results from frequent in-group ritual attendance with low levels of emotional intensity. The unexpected effect of fusion may suggest that emotionally intense experiences, such as those that are posited to cause fusion, may be more prevalent in Christian communities than previously assumed.

The study suggests that extended fusion and social identification are not as independent as they have been presented in some of the fusion literature (e.g., Gómez, Brooks, et al., 2011; Swann & Buhrmester, 2015; Swann et al., 2012; Whitehouse & Lanman, 2014). The analysis here found a significant interaction between frequency of in-group ritual attendance and fusion. The IIS and the DMR theory both suggest that frequency of in-group ritual attendance should be positively correlated with social identification, neither approach explicitly predicted that this relationship

should be affected by fusion. The simple slopes analysis of the data collected in this study revealed that the positive relationship between frequency of in-group ritual attendance and social identification appears to be stronger among individuals who are not highly fused. The results of this study suggest that highly-fused individuals can maintain higher levels of social identification even though their frequency of in-group ritual attendance has less of an effect. This finding presents an interesting parallel to the findings of Cheung and Li, who found that participation in ritualized events contributed less to national identification in individuals with high rates of national identification prior to participating in national rituals.

One explanation for this pattern may be due to how fusion and social identification are posited to be fostered by the IIS. As discussed in Chapter 2, social identification is supported by shared social schemas, which can be formed through frequent low arousal rehearsal of information like that which would be experienced in typical weekly services of doctrinal religions. The IIS posits that fusion is supported by the development of conceptual ties, which result from links being made between the group's social schema and one's personal schema by means of reflection on an emotionally intense experience. As such, simple actions of ritual attendance can support social identification, while emotionally intense experiences such as those experienced by being a performer of a ritual can foster fusion; here, "performer" refers to someone who is not just in the congregation, but is directly performing a ritual action, such as a priest, deacon, or patient in a baptism ritual. Future studies should investigate the extent to which different kinds of participation in a ritual can affect group alignment. For example, effects may be different for someone who participates in a ritual as an attendee in the congregation of a Sunday Service versus participating in the ritual as someone performing a ritual action in the role of a priest or a deacon. Given the likely self-selection of highly identified individuals into leadership roles in naturally occurring

groups, this may be a future direction for laboratory research where the role of an individual in a group is manipulated as they perform a contrived ritual. This could be investigated by collecting data on the roles an individual has in their church in addition to measures of frequency of in-group ritual attendance, social identification, and fusion.

The study reported here contributes to our understanding of social cohesion in doctrinal religions. While the relationship between frequency of in-group ritual attendance and social identification does support the prediction of the DMR theory (even when controlling for fusion), the effect of fusion with the participants' doctrinal religions found in this study requires further investigation to better understand the cause of fusion in these groups. In principle, if extended fusion is not based on conceptual ties, as proposed by the IIS, then it may be that the form of fusion driving the alignment in doctrinal religious groups is either 1) extended fusion based on relational ties or 2) *local*—not *extended*—fusion. The latter suggestion runs counter to the IIS as well as the DMR theory and would seem to suggest that doctrinal religious groups can be sustained through the intermingling of local clusters of individuals fused via relational ties. If more direct evidence for conceptual ties could be found in doctrinal religions, it could help to clarify the extent to which the idea of conceptual ties as a basis for extended fusion is plausible.

4. Emotional Intensity, Reflection, and Extended Fusion

The DMR theory (and the IIS extension) predicts that social identification should be the mechanism by which individuals align themselves to doctrinal religious groups. According to DMR theory and the IIS extension, social identification is based on shared schemas spread through attendance at frequent in-group rituals (Whitehouse, 2004a). The previous chapter reported a study that provides evidence that frequency of in-group ritual attendance can facilitate social identification in doctrinal religions. The results also revealed that many individuals were aligned to the group by means of extended fusion, which is posited to be the result of emotionally intense experiences. The present chapter sets out to clarify the role of fusion in doctrinal religions by testing hypotheses H2a, that the relationship between the emotional intensity associated with an experience and fusion to one's group is mediated by the perceived frequency of reflection and perceived centrality of the event, and H2b, that the relationship between the emotional intensity associated with an experience and fusion to an essential belief of one's group is mediated by the perceived frequency of reflection and perceived centrality of the event.

The DMR theory and IIS both suggest that emotionally intense experiences can have effects on group alignment. The DMR theory (Whitehouse, 2004a) and several fusion researchers (Swann et al., 2012; Whitehouse & Lanman, 2014) suggest that emotionally intense (oftentimes dysphoric) experiences can create flashbulb memories among those who experience an event. These flashbulb memories facilitate long lasting bonds between individuals known as relational ties. Examples of bonding by means of personal relationships can be found in many small groups,

such as military units, fraternities, close family members, and small tribal groups (Swann et al., 2012; Whitehouse, 2004a; Whitehouse & Lanman, 2014).

In groups that are too large to be bound exclusively by the social relationships between members, fusion theory predicts that individuals who undergo an emotionally intense experience can extend relational ties to the other members of their group (known as *extended* fusion). Recent research in the fusion literature suggests that the extent to which one reflects on an emotionally intense experience mediates the relationship between that experience and fusion with a group (Jong et al., 2016). As discussed in Chapter 2, the IIS extends this by suggesting that reflection on an emotionally intense experience results in extended fusion because an individual uses a relevant social schema to interpret an emotionally intense experience that is central to their personal identity, resulting in conceptual ties that form the basis of extended fusion (as opposed to relational ties).

The IIS's assertions concerning how emotionally intense experiences in doctrinal religions create extended fusion can be considered as a mediation model. In this model, both perceived frequency of reflection (mediator 1) and perceived centrality of an event (mediator 2) mediate the relationship between the emotional intensity associated with an experience and one's level of fusion. To clarify, the perceived centrality of an event refers to the extent to which individuals feel that an experience is defining of who they are and has an impact on their personal identity and life story. This model can be formalized as two testable hypotheses (H2a and H2b), because if extended fusion is based on conceptual ties, one should not only be fused to their group but also to essential beliefs in the group's social schema.

The IIS proposes that reflection has a different effect in large doctrinal religions (e.g., Christianity) than in smaller (in terms of their number of members) imagistic religions (e.g., the Melanesian religions described in Whitehouse, 2000). This is because imagistic religions, in

principle, generally lack the elaborate social schemas and narratives that are characteristic of large doctrinal religions. In imagistic religions, beliefs are often idiosyncratic and result from personal reflection and revelation—thus, within-group consensus is generally lower than in doctrinal religions. However, frequent attendance at low arousal rituals in doctrinal religions can consolidate complex schemas into semantic memory, which the IIS proposes can be employed to make sense of significant experiences in one's life. When reflecting, certain concepts that could be considered essential to the group represent probable targets for fusion via conceptual ties. For example, one such concept for Christian communities is that of God, which has been shown in a large corpus of sermons and texts to be one of the most frequently mentioned concepts in materials produced by a wide range of Christian communities (Lane, 2015b, 2016). Given the importance of God in the Christian social schema, it is likely that reflection upon a significant experience with a group will become connected back to one's understanding of God. As individuals fill in the gaps in personal meaning about an intense experience with information from the social schema, their social schema becomes integrated into their personal schema. As outlined in Chapter 2, this could conceivably result in the feeling of oneness and the porous boundary between personal and social identities.

The DMR theory predicts that socially shared emotionally intense experiences should not be found in doctrinal religions—and if they are the practices should die out. However, as discussed in Chapters 1 and 2, Charismatic and Pentecostal Christian communities have performed rituals that incorporate emotionally intense experiences for over a century. In addition to the weekly practices of Charismatic and Pentecostal Christians that present opportunities for one to have an emotionally intense experience, in many contemporary Christian communities (including but not limited to Charismatic and Pentecostal Christian communities), it is common for members of a church to go on a *retreat*. Retreats are meetings focused on worship and meditation that typically

last for a few (2-7) days and usually only a subset of the community attends, rather than the entire church. This subset is sometimes just those members of a church who decide to attend, but other times retreats are limited to specific age groups or ministries within the church. Some groups combine with groups from other churches (typically those with similar theological beliefs and worship practices) as well. During these events, the entire day is mostly scheduled with activities such as bible study, praise and worship, sermons, group recreational activities, and meals. Some additional rituals, such as the Holy Communion (or Eucharist) and baptisms can also be incorporated into the retreat. The retreat activities are typically led by some form of leadership and individuals are often challenged to reflect on their beliefs and faith in order to strengthen themselves and—as is often said in evangelical theological circles—"grow in Christ" (also see Luhrmann, 2012). Retreats are problematic for the DMR theory because they do not conform to its predictions, as discussed in Chapter 2, Section 2.1.1. Specifically, retreats are frequent (typically annual) events where it is not uncommon for some participants to have emotionally intense experiences. However, it is not always the case that an individual will have an emotionally intense experience every time they attend a retreat. However, the activities planned during Christian retreats encourage those in attendance to reflect on their beliefs in order to mature spiritually. As such, studies investigating the role of untutored reflection in Christian communities may wish to control for these effects as best as possible and be aware that they represent a potential confound.

Other intense religious experiences common to Pentecostal and Charismatic Christianity include being converted (when someone realigns him or herself with a religious tradition to which they were not previously aligned) and born again. Given that a conversion, by definition, involves a change in one's identification, it may be unsurprising they are often reported as being important milestones in one's life (as outlined in Lectures 9 and 10 of James, 1902).

Whereas conversion events mark a shift from one religious identity to another, being born again in the contemporary Christian tradition can be understood as a reaffirmation of one's faith and identity. Being born again is common in Charismatic and Pentecostal Christian groups, although less so in mainline Protestant and Catholic communities. Being born again is typically recounted as an intense experience where individuals report being filled with the Holy Spirit or slain in the Holy Spirit. Similarly, for some Christians who have been born again, the experience can be an important aspect of their personal identity. Being born again can come during periods of particular hardship (James, 1902) and is often reported as a deeply personal experience where one feels connected to Jesus or God (Luhrmann, 2012). Although it is uncommon for an individual to report being born again more than once, many individuals are familiar with the concept. Familiarity with the idea of being born again, as shared through the social schemas of contemporary Christian groups, would allow the experience to be interpreted more readily within a theological framework. The framework for interpreting born again experiences can be transmitted by pastors and lay-people in their church and is supported by biblical interpretation.[18] As such, emotionally intense experiences such as conversions and being born again in contemporary Christian traditions provide an opportunity to study emotionally intense experiences in a doctrinal tradition for which there are likely to be available social schemas for the interpretation of the experience.

It is worth noting that in Pentecostal and Charismatic Christian communities the experiences of being converted, born again, or being filled or slain in the Holy Spirit are generally described as euphoric. The relationship between dysphoric arousal and fusion has been the topic

[18] Specifically, John 3:3-5 and 1 Peter 1:22-23, which, in the original Greek, used to the term *ἀναγεγεννημένοι* (anagegennēmenoi) to refer to being "born again."

of both theoretical overviews (Swann et al., 2012; Whitehouse & Lanman, 2014) and empirical studies (Buhrmester et al., 2014; Jong et al., 2016; Newson et al., 2016; Whitehouse et al., 2017) in the fusion literature. To my knowledge, only two studies have focused on the role of euphoric (or "positive") experiences in promoting fusion (Kavanagh et al., 2018; Newson et al., 2016). The current study will address the role of euphoric arousal and attempt to overcome limitations of earlier studies noted in the next section.

4.1. Previous Research

For the current study, which seeks to examine the potential cause of extended fusion in doctrinal religions, the key variables to focus on are the intensity of emotional intensity associated with an experience, perceived frequency of reflection on the event, the perceived centrality of an event, and fusion (both to a group and to a specific idea). To my knowledge, no study has empirically investigated the extent to which both the perceived frequency of reflection and the perceived centrality of an event act as mediators in the relationship between the emotional intensity associated with an experience and fusion. However, there are studies which have examined some of these relationships and suggest that these relationships are plausible.

4.1.1. Previous Research: Reflection mediates the relationship between the emotional intensity of an experience and fusion

Jong et al., (2016) published three studies investigating the role of reflection in the fusion process. Because of the similarity between the Jong et al. study and the study presented in this Chapter, I will also include a detailed description of the measures used in this study to facilitate a comparison between previous research and the present study. In the first study presented by Jong et al, the authors distributed a survey in Northern Ireland amongst republicans and unionists (two groups that engaged in extensive conflict since the 1960s; for a historical overview see Bew &

Gillespie, 1999). The survey included a list of 12 negative experiences and participants were asked to report how many they had experienced in relation to their political identity (affirmative answers were coded as 1, negative answers as 0, and the answers were then summed to create a single measure of shared negative experience). The participants were also asked for a subjective rating of how severely they suffered as a result of their experience on a scale of "0-Not at All" to "5-Extremly"; I will refer to this measure as *subjective suffering*. They were then asked how frequently they felt that they suffered because of their political affiliation (on a 5-point scale: "Never"; "Very Rarely"; "Rarely"; "Occasionally"; "Frequently") and how severe they felt the suffering was (also on a 5-point scale: "Not at all"; "Slightly"; "Somewhat"; "Moderately"; "Extremely"). They were then presented with two questions aimed at assessing how frequently they reflect on their experience. The first question was "How often do you think about these experiences?" This measure was anchored at "I have only thought about them a little bit" and "I have spent many years reflecting on them" on a 6-point scale. The second question was "How much have these experiences been on your mind?" This measure was anchored at "I have thought about them sporadically" and "They are always on my mind" on a 6-point scale. The responses to these questions were averaged to create an approximate measure of reflection. Lastly, they were presented with the verbal fusion measure, discussed in Chapter 3, Section 3.2.2. A mediation model revealed that reflection significantly mediated the relationship between the number of shared negative experiences with the participants' group and their levels of fusion to their group. However, no evidence was found for a direct effect of the number of negative experiences on fusion. The analysis by Jong et al., also revealed that the relationship between the participants' subjective suffering ratings and fusion was significantly mediated by reflection; but unlike the previous model, there was a direct effect of subjective suffering on fusion.

In order to further investigate these patterns, a second study was run after the Boston Marathon Bombing in 2013 with participants who lived—or had lived—in Boston. Participants were primed to think about the bombing. Because the study addressed a single event, rather than many possible events over the course of many years (as was done during Study 1 with Northern Irish participants), the measure of shared negative experience was changed to two questions: "Did you see or hear or otherwise experience any aspect of the bombing directly?" and "Were you or any family members or friends directly injured in any way during the bombing?" (affirmative answers were coded as 1, negative answers as 0, and the answers were then summed to create a single measure of shared negative experience). The participants were also asked to complete the subjective suffering measure and verbal fusion scale described above. In order to measure reflection, they adapted the measures used in Study 1 by asking participants to answer the following questions on a 6-point scale anchored at "I have only thought about it a bit" and "It is always on my mind": 1) "How much do you think about your experience of the Boston Marathon Bombings?"; 2) "How much do you think about the meaning of the Boston Marathon Bombings?"; 3) "How much do you think about how the Boston Marathon Bombings could have turned out differently (e.g., how they could have been prevented, or how they could have been worse)?" Scores were averaged to form a single measure of reflection. As with Study 1, it was found that reflection significantly mediated the relationship between the measure of shared negative experiences and fusion, but there was no significant direct effect on negative experience and fusion. Echoing the results of Study 1, Study 2 also found that reflection significantly mediated the relationship between subjective suffering and fusion, and a significant direct effect was present.

In order to investigate and clarify the direction of causality between the previous studies, a third study was completed that used a priming task to manipulate the salience of the Boston

Marathon Bombing by asking participants to reflect on the event. A control group was asked to reflect on a recent shopping trip. Participants were then asked to complete the verbal fusion scale as well as the dynamic identity fusion index (Jimenez et al., 2015). This scale includes two circles (one representing the self and the other representing the group) that can be moved across the screen to be anywhere from fully overlapping to resting at opposing sides of the screen. The distance between the centroid of the circles and overlap between the circumferences of the circles is then computed. Instead of using the self-report measure of subjective suffering used in Studies 1 and 2, Mehrabian and Russell's semantic differential measure of core affect was used. This measure produces three scores: one for valence, one for arousal, and one for dominance. The valence score (which measured the positivity and negativity of the experience) was used in their subsequent analysis. Results found that the priming condition had a significant effect on valence, but not on fusion (as measured by the verbal fusion score). When testing if valence moderates the relationship between the priming condition and fusion, there was no significant main effect of either priming condition or negative affect on fusion. However, an interaction effect of priming condition and negative affect was found to significantly affect fusion. To better understand the effect, the authors estimated the effect of priming condition at the negative affect mean and one standard deviation above and below the negative affect mean. The results showed that increased salience of the bombing only increased fusion for individuals with high negative affect ratings. A similar pattern was also found when using the dynamic identity fusion index's overlap measure instead of the verbal fusion measure.

Taken together, the three studies by Jong et al., (2016) suggest that emotionally intense experiences can promote reflection, which results in fusion. However, these studies are subject to limitations. For example, one limitation of Study 3 was that the measure concentrated on the

emotional valence associated with an experience, not emotional intensity. In principle, fusion is said to be the result of emotionally intense dysphoric experiences. However, Study 3 only examined how negative (i.e., dysphoric) the experience was, not how intense it was; Jong et al., (2016) only reported that valence and intensity were not correlated, which may suggest that intensity was not significantly related to fusion. Fusion theory, as stated by Swann et al., (2012) and Whitehouse & Lanman (2014) both suggest that dysphoria and intensity are crucial in promoting fusion, yet the Jong et al., study concentrated on the ability of reflection to mediate the relationship between the valence of the experience and fusion, not its intensity. However, previous studies have found that negative, positive, and traumatic events do not significantly differ on how often one reflects on the event and how the event becomes important to one defines his or her self (see Byrne, Hyman, & Scott, 2001, p. S126). This suggests that emotional valence might not be the critical factor. The IIS posits that the intensity of arousal is the critical factor (Chapter 2, Section 2.3) and both dysphoric and euphoric experiences can result in fusion provided that the emotional intensity is sufficient to promote reflection and results in the experience becoming a central part of one's personal schema. Therefore, the study presented in this chapter treats arousal as an independent variable and uses valence for qualitative interpretation of how the experience is viewed by the participant. In addition, Study 2 by Jong et al., may have inadvertently introduced a confound by using a measure of fusion that was clearly addressing extended fusion (by using the city of Boston as the fusion target), while the measure of negative experiences may have been tapping variables related to local fusion. In the study, participants were asked "Were you or any family members or friends directly injured in any way during the bombing?" This appears to be directly addressing local fusion as relationships between family and friends would be actual, rather than the perceived relational ties underlying extended fusion. Future studies of extended fusion

should aim to create consistency between all measures regarding the target of fusion to better ensure that measures are not addressing local fusion when extended fusion is the intended variable of study.

4.1.2. Previous Research: Emotionally intense experiences can become central aspects of one's identity

Jong et al. note at the end of their article that "the precise nature of the personal reflection that joins shared negative experience to identity fusion is still unclear" (2016, p. 10). They suggest that further investigations of the relationship between reflection, which could cause an event to become self-defining, and fusion may be beneficial to increasing our understanding of fusion. The current study presented in this chapter is sympathetic to this proposal and tests to see if the perceived centrality of an event also mediates the relationship between an emotionally intense experience and fusion.

The perceived centrality of event literature, which explores how traumatic events become a central part of one's identity, reports evidence suggesting that emotionally intense events are indeed associated with perceived centrality of the event to one's identity later in life (Berntsen & Rubin, 2006). In a study of PTSD (Post-Traumatic Stress Disorder) using a population of 707 undergraduates, responses to the question "I feel the traumatic event has become part of my identity" were found to positively correlate with the frequency with which an individual had an intrusive memory in both participants with PTSD symptoms and participants without PTSD symptoms (Berntsen, Willert, & Rubin, 2003). This suggests that there is not only a relationship between an emotionally intense event and reflection on the event later, but also that the event can become part of a person's identity.

Berntsen and Thomsen (2005) investigated the effects of the German occupation on the identity of 145 Danish participants who lived through the occupation during World War II. To assess the perceived centrality of the event the authors had participants answer three questions: "I automatically see connections and similarities between this event and experiences in my present life," "I feel that this event has become part of my identity," and "This event has become a reference point for the way I understand myself and the world." All three questions were answered using a scale ranging from 1-totally disagree to 5-totally agree. They found that the average of the responses on these three questions correlated with frequency of intrusive memories about the event. Again, this suggests that emotionally intense experiences, such as the experiences of war discussed in the fusion literature (e.g., Atran, 2016; Whitehouse et al., 2017, 2014), can become important aspects of a person's identity.

In addition to the studies from the centrality of event literature, there are studies from the fusion literature, which suggest emotionally intense experiences can be incorporated into an important part of one's identity. A recent study by Newson, Buhrmester, and Whitehouse (2016) of football fans found that the extent to which both dysphoric and euphoric experiences had been important in shaping their identity (Newson et al, refer to this as "self-shapingness") had a significant positive relationship with fusion to the football club that they identify with. To assess fusion, they used the verbal fusion measure (see Appendix 3.6). To assess self-shapingness, participants were asked to answer the questions "to what extent have your team's wins shaped you as a person?" and "to what extent have your team's losses shaped you as a person?". Both questions recorded responses using a 7-point scale anchored at "Not at all" and "Extremely". Newson et al., treated the effect of wins as relevant to euphoric experiences and the effect of losses as relevant to dysphoric experiences. Given the measures used by Newson et al., their term "self-shapingness"

does appear to be measuring something similar to what the IIS calls centrality. However, the measure utilized in the Newson et al., study does not address a specific emotionally intense experience as a fan of their football club, rather the measure of euphoric and dysphoric self-shapingness addresses emotional sentiment that is related to wins and losses over a long period of time (as opposed to a specific win or loss shaped that person's identity). Nevertheless, using mediation regressions the analysis revealed that the relationship between self-shapingness and group loyalty is mediated by fusion; this was the case for both euphoric and dysphoric self-shapingness (Newson et al., 2016).

An additional study by Kavanagh, Jong, McKay, & Whitehouse, (2018) aimed to test "that high arousal rituals promote social cohesion, primarily through identity fusion" (p.1). In the study, participants were recruited from Brazilian Ju Jitsu clubs to participate in an online survey. In Brazilian Ju Jitsu, promotion to a new belt (or rank) within a club is sometimes marked through a painful "belt-whipping" ceremony where other members of the club line up and whip the initiate as they run past; it was also noted that many Brazilian Ju Jitsu clubs have banned this practice (Kavanagh et al., 2018, p. 10). Data were collected using the survey to test five hypotheses, two of which are relevant to the current study: 1) that individuals who experience more affectively arousing ritual promotions will report higher levels of fusion with their Brazilian Ju Jitsu school and 2) that negatively valenced affective arousal will display a stronger association with fusion than comparable positively valenced affective arousal. To collect data on fusion they used the verbal fusion score (see Appendix 3.6). To measure positive affect, they asked participants to rate to what extent they judged their experience to be: 1) enjoyable, 2) valuable, 3) meaningful, 4) unpleasant, 5) painful, and 6) intense on a 6-point scale anchored at "not at all" and "extremely". The results found that participants from groups with belt-whipping ceremonies reported higher

negative affect than those without belt-whipping ceremonies. However, the results found no evidence for the hypothesis that negatively valenced affective arousal will display a stronger association with fusion than comparable positively valenced affective arousal. In fact, both those participants from groups with belt-whipping ceremonies and those without had significantly higher positive affect ratings of the experience than negative affect ratings regarding their experience and there was a significant correlation found between positive affect scores and fusion. However, no significant correlation found between negative affect scores and fusion. From an outsider's perspective, these results are perplexing because of the pain associated with the belt-whipping ceremony. It appears that after the event, individuals attribute positive emotions to the experience, even though the pain of the experience would suggest that it was a dysphoric experience.

The most recent study to report a relationship between an emotionally intense experience, the perceived centrality of an event and fusion comes from Buhrmester, Burnham et al., (2018), which was run after the data was collected for the present study. Nevertheless, it provides the clearest evidence that emotionally intense experiences are related to the perceived centrality of an event and fusion. The study not only measures reflection, the perceived centrality of the event, and fusion with a group, but also fusion with a concept that is important to the group (but is not the group itself). In their study, Buhrmester, Burnham et al., looked to investigate how dysphoric reactions to the death of "Cecil the lion" (a research lion that was killed by a trophy hunter in Zimbabwe in 2015 and subsequently became a viral internet topic; see Macdonald, Jacobsen, Burnham, Johnson, & Loveridge, 2016), was related to social cohesion among donors to the Wildlife Conservation Research Unit (WildCRU), the research unit that was studying the lion. Multiple hypotheses were tested that are directly relevant to the propositions of the IIS. The first relevant hypothesis tested the claim "that participants who experienced high levels of dysphoria in

response to Cecil's death would (1) experience strong fusion to Cecil, and (2) in turn, feeling that Cecil's death has bound WildCRU donors closer together, experiencing strong fusion to WildCRU" (Buhrmester, Burnham, et al., 2018, p. 2). The second relevant hypothesis tested the claim "that fusion would increase most for participants who both (1) reported especially high amounts of reflection after Cecil's death, and (2) reported especially strong perceptions that Cecil's death has been a central experience for understanding one's personal identity and the identities of others who also experienced Cecil's death" (Buhrmester, Burnham, et al., 2018, p. 2). The authors deployed a study online in the winter of 2015 and then again in the summer of 2016. They used the pictorial fusion scale (see Appendix 3.6) to measure fusion to the group "WildCRU" as well as to "Cecil the Lion". They measured state dysphoria (a form of emotional intensity) using an 8-item checklist, which "ask participants to check whether they had, for instance, felt intense anger in the wake of Cecil's death" (Buhrmester, Burnham, et al., 2018, p. 3). Reflection was measured by asking participants to respond to "a four-item measure designed to assess their *depth of reflection* on Cecil's death" (emphasis in original; Buhrmester, Burnham, et al., 2018, p. 3). Lastly, the authors "included a two-question measure designed to assess *self/group centrality*, i.e., the extent to which Cecil's death and story was a personally central experience as well as a similarly central experience for fellow conservationists" (emphasis in original; Buhrmester, Burnham, et al., 2018, p. 3). The authors used a mediation model to test the first hypothesis and found that the relationship between dysphoria and fusion to WildCRU was mediated by fusion to Cecil the lion. To test the second hypothesis above the authors used two linear regressions. The first found that dysphoric intensity at time 1 predicted depth of reflection and self/group centrality at time 2. The second used a multiple regression with reflection, self/group centrality, and the interaction between reflection and self/group centrality as predictors of change in fusion to the group WildCRU. They found a

significant interaction effect of reflection and self/group centrality on fusion. The effect of reflection on fusion was only significant when self/group centrality was high, but not when self/group centrality was low. This indicates that the increase in fusion to the group WildCRU happened among participants who engaged in high levels of reflection *and* felt that the death of Cecil the Lion was a central self and group experience. Those who did not score highly on the depth of reflection and self/group centrality measures "reported little to no change or a decrease in fusion" (Buhrmester, Burnham, et al., 2018, p. 4). However, it does not appear that they tested whether reflection mediated the relationship between dysphoria and fusion (which is why this study is not discussed in the previous section).

The study by Buhrmester, Burnham et al., (2018) presents the best direct evidence for relationships between an emotionally intense experience, reflection, the perceived centrality of the event, and fusion. It also provides evidence for the idea that one can be fused to a non-group concept (Cecil the Lion), such as the essential beliefs described in Chapter 2. In addition, the results of the study indicate that there is a relationship between fusion with a group (WildCRU) and fusion with a concept related to the group (Cecil the Lion). However, there are several ways in which the study could be changed to more directly test the claims of the IIS. The second hypothesis stated by Buhrmester, Burnham et al., focused on "high amounts of reflection" (2018, p. 2). This would appear very similar to the IIS's claim, however, they used a measure of the "depth of reflection" adopted from the study by Jong et al., (2016). The IIS suggests that it is the frequency of reflection upon an experience that should mediate the relationship between the emotional intensity of the experience and fusion as reflection serves as the rehearsal mechanism that promotes consolidation into semantic memory and thus the creation of conceptual ties. This is not to say that the depth of the reflection would not be a significant aspect of the relationship between reflection and an

emotionally intense experience and fusion, or even that depth of reflection is unrelated to frequency of reflection, only that a more direct test of the IIS would focus on frequency of reflection. The study also found a relationship between self/group centrality and fusion. However, the measure of centrality used in their study is arguably not the best fit for a study of centrality in the sense that the IIS refers to centrality. In the IIS, the perceived centrality of the event focuses on the centrality of an event on one's own personal identity. The extent to which other members of the group are also perceived to share that experience is not considered the most relevant point. To clarify, this is not to say that perceiving other individuals to have had a similar experience is not important; previous studies argue and present evidence that sharing emotionally intense experiences is important to fusion (e.g., Jong et al., 2016). However, the IIS proposes that conceptual ties (the basis for extended fusion) are the result of reflection on an experience that, in turn, results in the experience being viewed as central to their identity and causes ties to form between the group's social schema and one's personal schema as one interprets the event using the group's social schema. As such, one can undergo an emotionally intense experience by one's self and still have it result in fusion. From the perspective of the IIS, it is not necessary that other individuals also view the experience as central, only that the individual incorporates the conceptual ties linking their personal and social schemas as a central part of their own identity. That is to say, within the IIS, the result found by Buhrmester, Burnham et al., that dysphoric intensity at time 1 predicted depth of reflection and self/group centrality at time 2, should hold even if the centrality of event scale is designed to capture centrality to one's self, not centrality to other group members. Lastly, although the study by Buhrmester, Burnham et al., measured emotional intensity, reflection, self/group centrality, and fusion to both group and a non-group concept that could be considered essential to the group, no statistical test reported in their study tested the hypotheses proposed in

this chapter, which both state that the relationship between emotional intensity and fusion is mediated by *both* reflection and the perceived centrality of event. Nevertheless, there are two reasons why an additional investigation is required to find more direct evidence for the relationships proposed by the IIS: 1) no prior analysis investigated whether reflection and the perceived centrality of the event mediate the relationship between emotional intensity and fusion; 2) the measures used for reflection and centrality in the Buhrmester, Burnham et al., study address aspects of reflection and centrality that are not the same as those proposed by the IIS, despite their similarity.

Taken as a whole, the studies by Jong et al., (2016) and Buhrmester, Burnham et al., (2018) suggest that reflection can mediate the relationship between the emotional intensity of an experience and fusion to the social identity associated with that experience. Additionally, studies from the centrality of event literature (Berntsen & Rubin, 2006; Berntsen & Thomsen, 2005; Berntsen et al., 2003) and previously published studies from the fusion literature (e.g., Buhrmester, Burnham, et al., 2018; Newson et al., 2016) suggest that emotionally intense experiences can result in the experience becoming a central aspect of one's identity and that reflection can play an important role the fusion process. In addition, the studies by Newson et al., (2016) and Kavanagh et al., (2018) found evidence that fusion can result from experiences that are perceived as positive, suggesting that it is possible that the emotionally intense and euphoric experiences of contemporary Pentecostal and Charismatic Christians may result in fusion.

In the current study, different measures were used to capture the variables of interest in a way that is more congruent with the IIS's proposals. By using these measures, the current study collects data to test that the relationship between the emotional intensity associated with an experience and fusion is mediated positively by both a) the perceived frequency of reflection on

the event and b) the perceived centrality of the event. It tests this hypothesis in relation to fusion with a group as well as fusion with God, an essential belief for Christians. In addition, it the analysis explores the extent to which contemporary Christians view their emotionally intense experiences as euphoric and presents partial replications of earlier studies by testing mediation models of the same structure as the Jong et al., (2016) and Buhrmester, Burnham et al., (2018) studies using data from contemporary Christian communities.

4.2. Methods

This study tested the hypotheses (H2a and H2b) that the relationship between the emotional intensity associated with an experience (IV) and fusion to one's group (DV for H2a) or fusion to God (DV for H2b) is mediated by perceived frequency of reflection (M1) and the perceived centrality of the event (M2). Participants were recruited from the UK and Singapore using the Qualtrics recruiting pool to complete a brief survey as part of the collaboration between the Singapore Religion and Spirituality Project and the Oxford Religion and Spirituality Project. They were offered a small financial compensation for their time of £5 (or an equivalent amount in Singaporean Dollars). The survey began by asking if the participant was a member of a Christian community (the study included both Catholic and Protestant participants). This was used as a means for exclusion in attempt to get data from only one religious group (i.e., Christians). All individuals were prompted to answer the same questions except for those who answered affirmatively to having at some point had "deeply personal or emotional religious or spiritual experience". Those who said they have had a significant religious or spiritual experience were asked to answer questions about how positive or negative they felt the experience was, how often they reflect on the experience, and were asked to complete the centrality of event scale (measures are discussed in section 4.2.2.).

As this survey was undertaken in collaboration with the Oxford Religion and Spirituality Project, the survey included additional questions not used to test the hypotheses discussed in this dissertation. This included questions of how similar participants felt they were to their congregation in regard to their beliefs, ethnicity, and socio-economic standing and the supernatural belief scale (Jong, Bluemke, & Halberstadt, 2013). Participants were also asked about their life satisfaction and how satisfied they were as part of their religious community.

4.2.1. Participants

After removing those participants who did not complete the entire survey (N = 680) and those who did not report having a significant religious experience (N = 256), the final participant sample included 521 individuals (male = 218; female = 303). The sample included 283 participants currently living in Singapore and 238 currently living in the UK. The participants' ages ranged from 18-84 years (M = 24.18; SD = 13.27). Participants were drawn from many denominations: Roman Catholic 20.9%; Anglican 18%; Independent or non-denominational 10.9%; Methodist 8%; Baptist 5.4%; no other denomination or affiliation made up > 5% of the sample. Data from this study was also included in the analysis in Chapter 3.

4.2.2. Measures

In order to comprehensively test hypotheses H2a and H2b, data were collected on *social identification, fusion with the participant's group (their church), fusion to the concept God, perceived frequency of reflection, emotional intensity, and the perceived centrality of an event*; namely, an event with religious or spiritual significance. Due to the potential effects of attending retreats, the study also collected data on participants' *frequency of retreat attendance*. A depiction of all scales can be found in the copy of the online survey in Appendix 2.2.

Social identification was measured by the Postmes 4-item social identification scale. The measure used the participant's church as the target group for identification. This is the same scale as used in Chapter 3. A full copy of the scale can be found in Appendix 3.2.

Fusion with a group was measured with the verbal fusion scale. The target group of the measure was the participant's church. A full copy of the scale can be found in Appendix 3.6.

In order to measure fusion with the concept God, the dynamic identity fusion index (Jimenez et al., 2015) was used. The dynamic identity fusion index is a web-based measure, written in JavaScript that animates two circles, allowing the participant to drag them closer together (including a total overlap of the two), or further apart (to where the two circles are on opposite sides of the screen). The computational nature of the measure facilitates the immediate calculation of two measures from the scale: overlap and distance. The overlap measure reports the percentage of the small circle area that lies within the big circle. The distance measure reports the numbers of pixels that separate the edges of both circles (Jimenez et al., 2015). In this study the overlap measure is used in the analysis as previous studies of the measure have found the overlap measure to be better indicator of fusion than the distance measure (see Jimenez et al., 2015, p. 8).

Perceived frequency of reflection was measured by a self-report response to the question "I often reflect on my experience" on a 6-point Likert scale anchored at "Strongly disagree" to "Strongly agree".

Emotional intensity was measured by responses to the question "How emotionally intense was the experience?" on a 9-point scale anchored at "Not at all" to "Extremely intense".

The perceived centrality of the event was measured using the centrality of event scale (Berntsen & Rubin, 2006), which is an 8-item measure that utilizes a 6-point Likert scale anchored at "Strongly Disagree" to "Strongly Agree". It asks participants to respond to statements such as

"I feel that this event has become part of my identity" and "This event has become a reference point for the way I understand myself and the world".

To measure frequency of retreat attendance, participants were asked to answer the question "How frequently have you attended a church retreat or a large devotional or religious conference?" on a 6-point scale with the response options: "Never"; "Once"; "Rarely"; "Every other year or so"; "Yearly"; and "two or more times a year".

Participants were also asked to report how positive or negative the experience was on a scale from -4 (very negative) to 4 (very positive) and asked to describe the event as either a conversion, a born-again experience, or other. This was recorded to explore the extent to which the emotionally intense experiences that participants referred to can be considered euphoric or dysphoric. The survey also included standard demographic questions.

4.3. Results

Responses showed high levels of consistency on the social identification (α = .94), fusion (α = .94), and perceived centrality of event (α = .92) measures. Participants generally reported levels of identification, fusion with their group, fusion to God, emotional intensity, perceived centrality of event, and perceived frequency of reflection that were toward the upper end of their respective measures (descriptive statistics are included in Table 6 below). Regarding the participants' response to the question on the valence of their emotional experience, the overwhelming majority (91.5%) reported that their experience was positive, only 9.5% of the sample said that it was negative or neutral; thus, the distribution was highly skewed.

Mann-Whitney U tests revealed no significant differences between the samples from Singapore and the UK on measures of perceived frequency of reflection, social identification, perceived centrality of event, fusion with God, frequency of retreat attendance, or emotional

valence. However, participants from the UK reported significantly higher levels of emotional intensity than those from Singapore (U = 28445.00; p < .01). In addition, participants from Singapore reported significantly higher levels of fusion to their group than those from the UK (U = 29161.50; p = .01). Descriptive statistics for all variables by country can be found in Table 6 below.

Table 6

Descriptive statistics table for the total, UK, and Singaporean samples.

Sample	Variable	*M*	*SD*	*Mdn*	*Skewness*	*Kurtosis*
Total	Emotional intensity	6.97	1.67	7.00	-0.88	0.68
	Frequency of reflection	4.48	1.07	5.00	-0.44	-0.23
	Perceived centrality of event	3.81	0.80	3.88	-0.67	0.56
	Social identification	5.15	1.26	5.00	-0.60	0.75
	Fusion with group	3.85	1.10	4.00	-0.37	-0.02
	Fusion with God	74.56	49.98	82.00	-0.70	-0.18
	Valence of emotional experience	2.67	1.64	3.00	-1.80	3.72
UK	Emotional intensity	7.21	1.61	7.00	-0.90	0.71
	Frequency of reflection	4.55	1.09	5.00	-0.55	-0.03
	Perceived centrality of event	3.75	0.86	3.88	-0.84	0.78
	Social identification	5.19	1.38	5.00	-0.73	0.56
	Fusion with group	3.71	1.16	3.71	-0.24	-0.23
	Fusion with God	75.15	50.54	83.00	-0.62	-0.66
	Valence of emotional experience	2.66	1.80	3.00	-1.94	3.95
Singapore	Emotional intensity	6.76	1.70	7.00	-0.88	-0.65
	Frequency of reflection	4.42	1.06	4.00	-0.34	-0.36
	Perceived centrality of event	3.86	0.74	3.88	-0.37	-0.16
	Social identification	5.11	1.14	5.00	-0.45	0.89
	Fusion with group	3.96	1.04	4.00	-0.45	0.32
	Fusion with God	74.06	49.59	82.00	-0.77	0.26
	Valence of emotional experience	2.68	1.49	3.00	-1.53	2.76

Note: The perceived frequency of reflection is presented below as "Frequency of reflection" for succinctness.

To test hypotheses H2a and H2b, serial mediation models were run using the PROCESS macro for SPSS (Hayes, 2014). Serial mediations with two mediators can be tested using model 6

of the PROCESS macro and tests a model structure whereby there are two mediating variables (M1 and M2). This serial mediation model has three indirect effects. Indirect effect 1 goes from X to M1 to Y. Indirect effect 2 goes from X to M1 to M2 to Y. Indirect effect 3 goes from X to M2 to Y. The conceptual schematic of this model is presented in Figure 5 below.

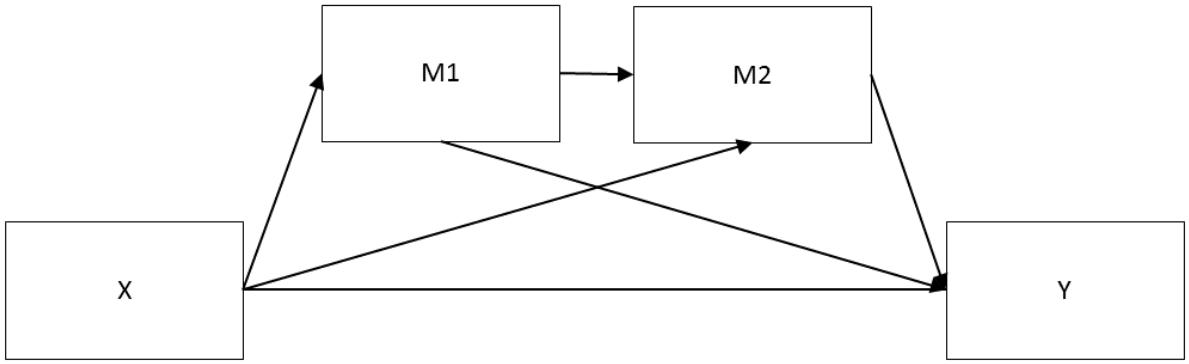


Figure 5. Serial effect, dual mediation model (PROCESS Model 6) schematic

In Model 1, the dependent variable (X) is emotional intensity and the independent variable (Y) is fusion as measured by the verbal fusion scale. Model 2 uses the same structure but the dependent variable (Y) is the participant's fusion with God as measured by the dynamic identity fusion index. In both models, frequency of retreat attendance is used as a statistical control and the two mediating variables are perceived frequency of reflection upon the experience (M1) and the perceived centrality of the event (M2). Using this structure, the first indirect effect is the effect perceived frequency of reflection has as a mediator between emotional intensity and fusion. The second is the effect that perceived frequency of reflection and the perceived centrality of the event have on the relationship between emotional intensity and fusion. The third is the effect that the perceived centrality of the event has on mediating the relationship between emotional intensity and fusion.

Due to the differences in emotional intensity and verbal fusion between the two samples, Models 1 and 2 were tested using the data from each sample separately. The results of running the models using all participants pooled together can be found in Appendix 4.3.1. In addition, regression coefficients for the control variable for all models can be found in Appendix 4.3.1. The results of running these models without controlling for reflection, which yielded no qualitative differences from the models that controlled for fusion, can be found in Appendix 4.3.2.

To address the non-normal distribution of the data, bootstrapping (5,000 bootstrapped samples) was used to increase robustness for the 95% confidence intervals for all mediation models presented in this chapter. Differences were found between the two groups' results for Model 1, which tested that perceived frequency of reflection (M1) and perceived centrality of event (M2) mediate the relationship between emotional intensity and fusion to one's social group when controlling for frequency of retreat attendance. Specifically, in the Singaporean sample, significant effects were not found for the direct effect (B = -0.03; SE = 0.04; t = -0.91; 95% CI = [-0.11, 0.04]) or indirect effect 1 (B = .03; SE = 0.02; β = .03; 95% CI = [-0.004, 0.08]). Significant effects were found for indirect effect 2 (B = 0.04; SE = 0.01; β = 0.04; 95% CI = [0.02, 0.06]) and indirect effect 3 (B = 0.06; SE = 0.02; β = 0.06; 95% CI = [0.03, 0.11]).

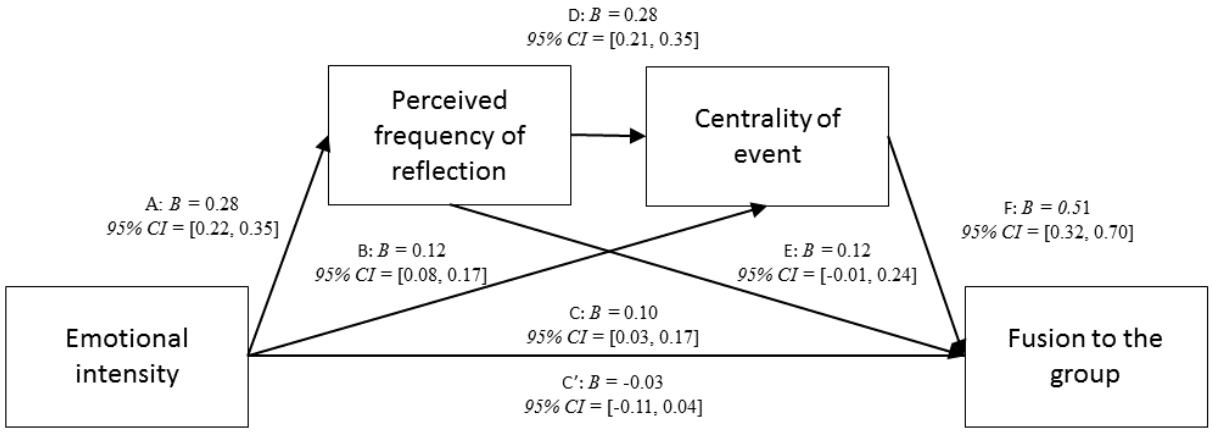


Figure 6. This is a visual depiction of serial mediation model 1 using the data from the Singaporean sample. The model controls for frequency of retreat attendance. The figure includes the coefficients and 95% confidence intervals for the individual regressions in the model. The regressions are A: regression of perceived frequency of reflection (DV) and emotional intensity (IV). B: regression of perceived centrality of event (DV) and emotional intensity (IV). C: total effect of emotional intensity (X) on fusion to the group (Y). D: regression of perceived centrality of event (DV) and perceived frequency of reflection (IV). E: regression of fusion to the group (DV) and perceived frequency of reflection (IV). F: regression of fusion to the group (DV) and perceived centrality of event (IV). C' represents the direct effect of emotional intensity (X) on fusion to the group (Y). All indirect effects are reported in the preceding paragraph. In this model X always serves as the IV and Y as the DV.

In the sample from the UK, no significant direct effect was found (B = -0.06; SE = 0.04; t = -1.32; 95% CI = [-0.14, 0.03]). However, significant indirect effects were found for indirect effect 1 (B = 0.05; SE = 0.02; β = 0.05; 95% CI = [0.004, 0.10]), indirect effect 2 (B = 0.04; SE = 0.01; β = 0.04; 95% CI = [0.02, 0.07]), and indirect effect 3 (B = 0.06; SE = 0.02; β = 0.05; 95% CI = [0.03, 0.10]).

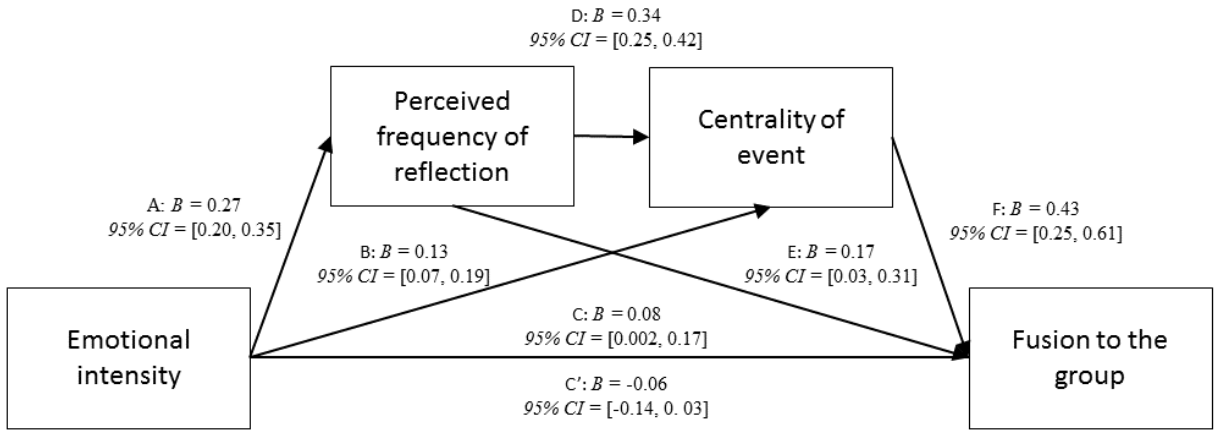


Figure 7. This is a visual depiction of serial mediation model 1 using the data from the UK sample. The model controls for frequency of retreat attendance. The figure includes the coefficients and 95% confidence intervals for the individual regressions in the model. The regressions are A: regression of perceived frequency of reflection (DV) and emotional intensity (IV). B: regression of perceived centrality of event (DV) and emotional intensity (IV). C: the total effect of emotional intensity (X) on fusion to the group (Y). D: regression of perceived centrality of event (DV) and perceived frequency of reflection (IV). E: regression of fusion to the group (DV) and perceived frequency of reflection (IV). F: regression of fusion to the group (DV) and perceived centrality of event (IV). C' represents the direct effect of emotional intensity (X) on fusion to the group (Y). All indirect effects are reported in the preceding paragraph. In this model X always serves as the IV and Y as the DV.

No qualitative differences were found between the two samples regarding the results of Model 2. In Singapore, significant effects were not found for the direct effect (B = -3.32; SE = 1.92; t = -1.73; 95% CI = [-7.10, 0.47]) or indirect effect 1 (B = 0.11; SE = 0.87; β = 0.002; 95% CI = [-0.03, 0.04]). Significant indirect effects were found for indirect effect 2 (B = 1.85; SE = 0.49; β = 0.04; 95% CI = [0.02, 0.06]) and indirect effect 3 (B = 2.86; SE = 0.82; β = 0.06; 95% CI = [0.03, 0.10]).

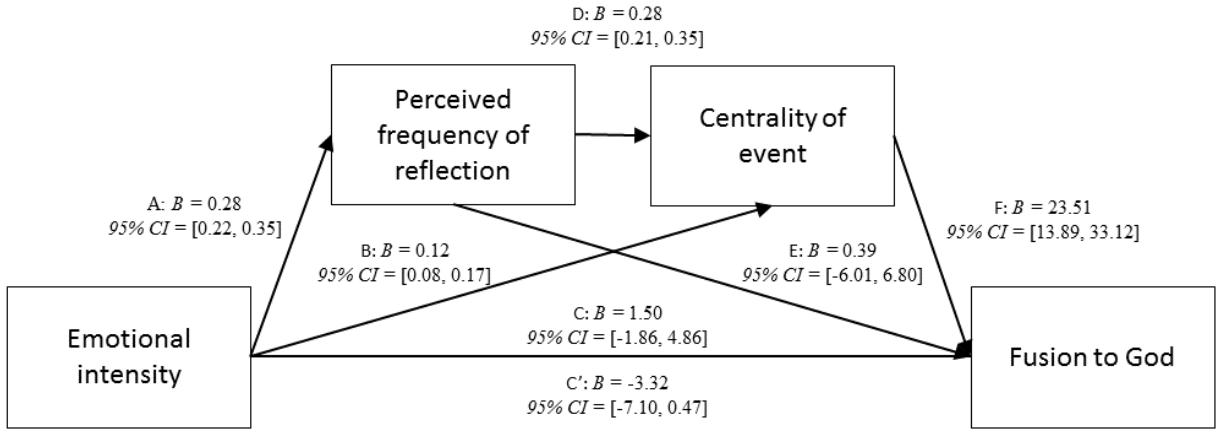


Figure 8. This is a visual depiction of serial mediation model 2 using the data from the Singaporean sample. The model controls for frequency of retreat attendance. The figure includes the coefficients and 95% confidence intervals for the individual regressions in the model. The regressions are A: regression of perceived frequency of reflection (DV) and emotional intensity (IV). B: regression of perceived centrality of event (DV) and emotional intensity (IV). C: the total effect of emotional intensity (X) on fusion to God (Y). D: regression of perceived centrality of event (DV) and perceived frequency of reflection (IV). E: regression of fusion to God (DV) and perceived frequency of reflection (IV). F: regression of fusion to God (DV) and perceived centrality of event (IV). C' represents the direct effect of emotional intensity (X) on fusion to God (Y). All indirect effects are reported in the preceding paragraph. In this model X always serves as the IV and Y as the DV.

In the sample from the UK, significant effects were not found for the direct effect (B = 1.31; SE = 2.11; t = 0.62; 95% CI = [-2.85, 5.47]) or indirect effect 1 (B = 1.51; SE = 1.13; β = 0.03; 95% CI = [-0.01, 0.08]). Significant indirect effects were found for indirect effect 2 (B = 1.56; SE = 0.66; β = 0.03; 95% CI = [0.01, 0.06]) and indirect effect 3 (B = 2.19; SE = 0.79; β = 0.04; 95% CI = [0.02, 0.08]).

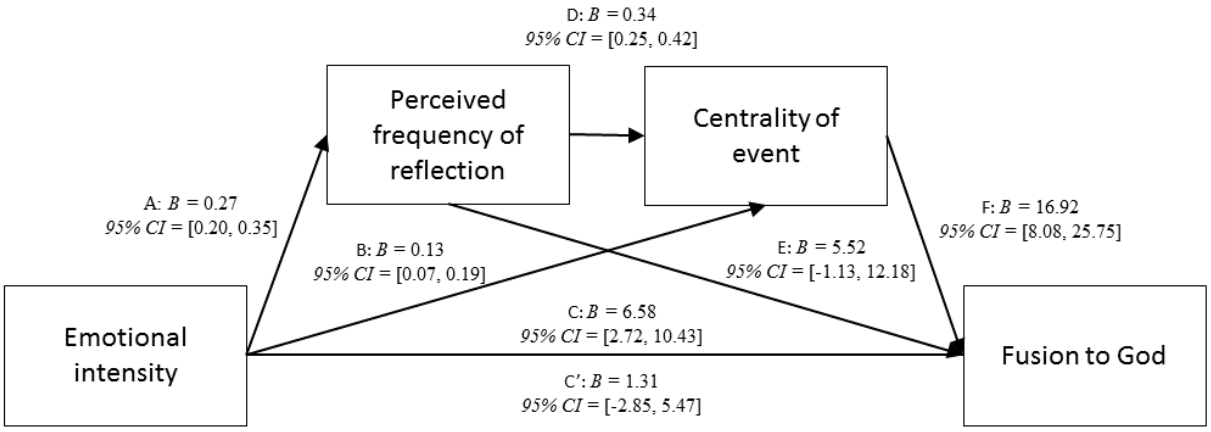


Figure 9. This is a visual depiction of serial mediation model 2 using the data from the UK sample. The model controls for frequency of retreat attendance. The figure includes the coefficients and 95% confidence intervals for the individual regressions in the model. The regressions are A: regression of perceived frequency of reflection (DV) and emotional intensity (IV). B: regression of perceived centrality of event (DV) and emotional intensity (IV). C: the total effect of emotional intensity (X) on fusion to God (Y). D: regression of perceived centrality of event (DV) and perceived frequency of reflection (IV). E: regression of fusion to God (DV) and perceived frequency of reflection (IV). F: regression of fusion to God (DV) and perceived centrality of event (IV). C' represents the direct effect of emotional intensity (X) on fusion to God (Y). All indirect effects are reported in the preceding paragraph. In this model X always serves as the IV and Y as the DV.

The sample size was sufficient to achieve an acceptable power. To analyse the power of the mediation models testing the key hypotheses of this chapter (H2a and H2b), the powerMediation R package was used (Qiu, 2017). The result of the power analysis showed an acceptable power > .80 for all models. The using the Singaporean sample, power = .98 (estimated assuming the following parameters: n = 283, θ =.28, λ = .12, σ_x = 1.70, σ_m = .74, σ_ε = .27, and α = .05). Using the UK sample, power = .95 (estimated assuming the following parameters: n = 283, θ =.13, λ = .43, σ_x = 1.61, σ_m = .86, σ_ε = .51, and α = .05). This fits with earlier analyses showing that to achieve acceptable power using bootstrapped sampling of indirect effect mediation models,

samples of 36 (for strong effects) to 558 (for weak effects) are required (Fritz & Mackinnon, 2007).[19]

In addition, this data can be used to potentially replicate some of the findings of Jong et al., (2016), mediation models were run testing the hypothesis that the relationship between emotional intensity and fusion is mediated by reflection. The models were run with both fusion to the group and fusion to God as the dependent variable of the model and models were run for the UK and Singaporean samples separately. Unlike in the previous mediation models, retreat attendance was not entered as a control because this analysis aimed to replicate the results of Jong et al., which did not include any controls in their analysis. Results of running the models using the total pooled sample can be found in Appendix 4.3.3. The analysis generally replicated the findings of Jong et al., (2016). The analysis of the UK sample revealed no significant direct effect of emotional intensity on fusion with the group (*B* = -0.004; *SE* = 0.05; *t* = -0.08; *95% CI* = [-0.10, 0.09]) or fusion with God (*B* = 3.46; *SE* = 2.12; *t* = 1.63; *95% CI* = [-0.72, 7.65]). It was found that perceived frequency of reflection mediates the relationship between emotional intensity and fusion to the group (*B* = 0.11; *SE* = 0.03; *95% CI* = [0.06, 0.18]; results depicted in Figure 10) and emotional intensity and fusion to God (*B* = 3.53; *SE* = 1.21; *95% CI* = [1.56, 6.37]; results are depicted in Figure 11).

[19] Methods for calculating power analyses for mediation regressions and structural equation models is debated (Fritz & Mackinnon, 2007; Krebsbach, 2014; Westland, 2010) and not currently supported by common power analysis software such as g*power (Faul, Erdfelder, Buchner, & Lang, 2009). "Rule of thumb" approaches suggest a sample of at least 100 for such analyses, and analyses of simulated data show that even for weaker and more complex models, sample sizes of 500 are sufficient to reach acceptable power (Wolf et al., 2013). For all of the above models, the achieved power was calculated based on the weakest effect in the model.

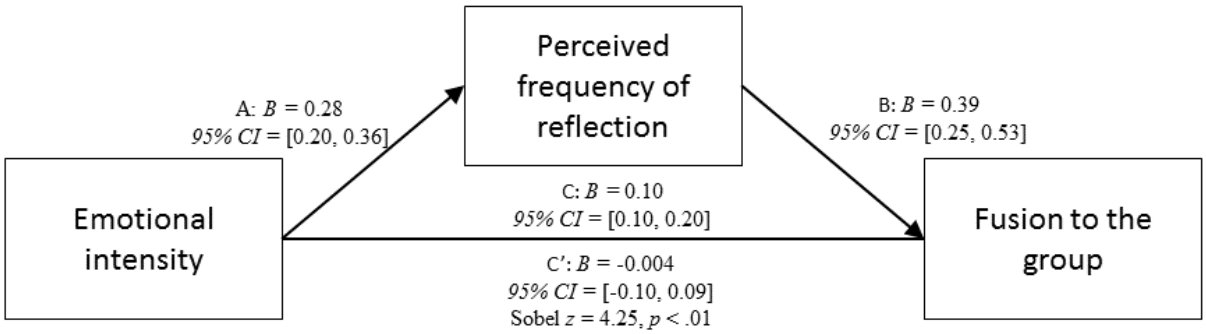


Figure 10. Mediation model testing the hypothesis that the relationship between emotional intensity and fusion to the group is mediated by perceived frequency of reflection using participants from the UK.

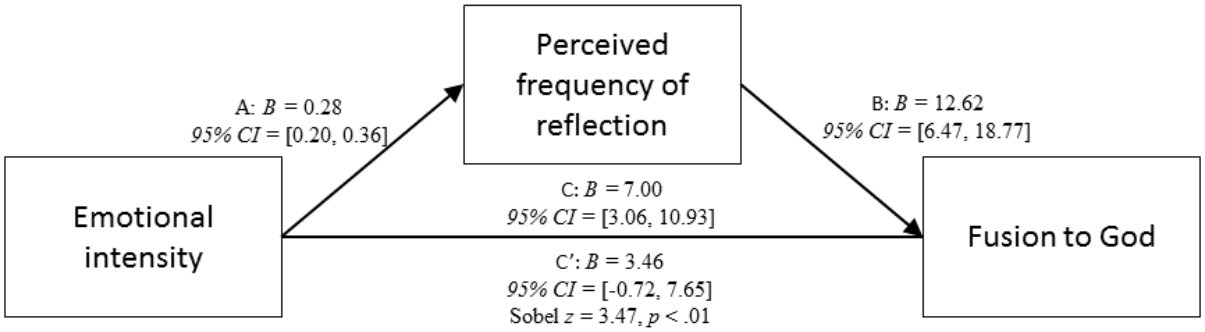


Figure 11. Mediation model testing the hypothesis that the relationship between emotional intensity and fusion to God is mediated by perceived frequency of reflection using participants from the UK.

The analysis of the Singaporean sample revealed no significant direct effect of emotional intensity on fusion with the group (B = 0.04; SE = 0.04; t = 0.94; 95% CI = [-0.04, 0.11]) or fusion with God (B = -0.17; SE = 1.48; t = 0.25; 95% CI = [-3.98, 3.65]). It was found that perceived frequency of reflection mediates the relationship between emotional intensity and fusion to the group (B = 0.08; SE = 0.02; *95% CI* = [0.04, 0.13]; results are depicted in Figure 12) as well as emotional intensity and fusion to God (B = 2.30; SE = 0.98; *95% CI* = [0.60, 4.52]; results are depicted in Figure 13).

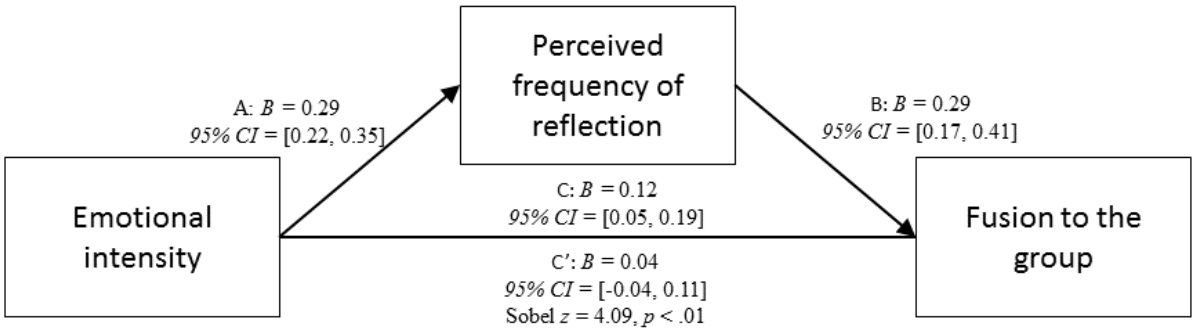


Figure 12. Mediation model testing the hypothesis that the relationship between emotional intensity and fusion to the group is mediated by perceived frequency of reflection using participants from Singapore.

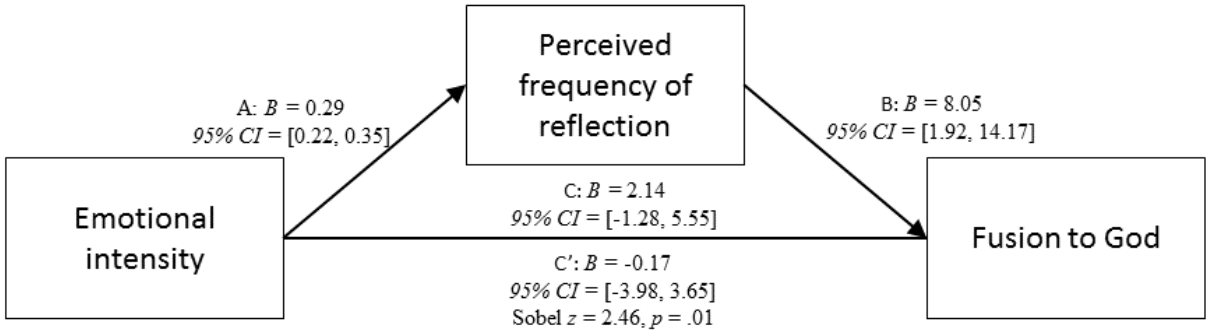


Figure 13. Mediation model testing the hypothesis that the relationship between emotional intensity and fusion to God is mediated by perceived frequency of reflection using participants from Singapore.

Lastly, the data collected here can also be used to replicate the findings of Buhrmester, Burnham, et al., (2018) by testing if the relationship between emotional intensity and fusion to the group is mediated by fusion to God. Due to the significant differences found between the two groups on the emotional intensity and fusion to the group, the samples were analysed separately. Results using both samples pooled together can be found in Appendix 4.3.4.

The first model tested whether the relationship between emotional intensity and fusion to the group is significantly mediated by fusion to God using the sample drawn from the UK. This model did not find a significant direct effect (B = 0.03; SE = 0.04; t = 0.61; *95% CI* [-0.06, 0.11]) but did find a significant indirect effect (B = 0.08; SE = 0.03; *95% CI* [0.03, 0.13]). Results are depicted in Figure 14 below.

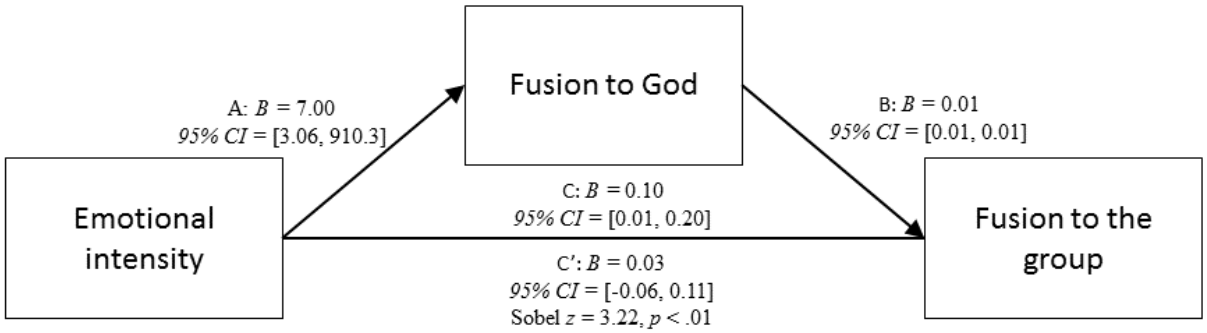


Figure 14. Mediation model testing the hypotheses, inspired by Buhrmester, Burnham et al., that the relationship between emotional intensity and fusion to a group is mediated by fusion to a concept that is important to the group using participants from the UK sample.

The second model tested whether the relationship between emotional intensity and fusion to the group is significantly mediated by fusion to God using the sample drawn from Singapore. This model revealed a significant direct effect (B = 0.10; SE = 0.001; t = 8.64; *95% CI* [0.04, 0.16]) but did not find a significant indirect effect (B = 0.0002; SE = 0.0002; *95% CI* [-0.0001, 0.001]). Results are depicted in Figure 15 below.

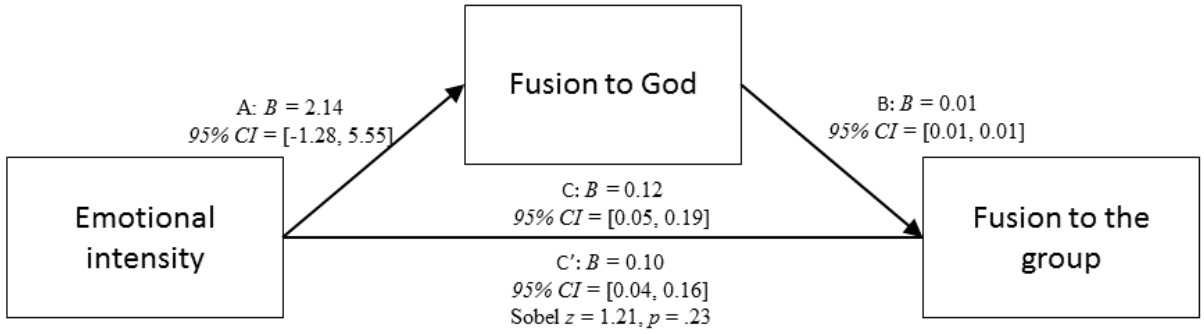


Figure 15. Mediation model testing the hypotheses, inspired by Buhrmester, Burnham et al., that the relationship between emotional intensity and fusion to a group is mediated by fusion to a concept that is important to the group using participants from the Singaporean sample.

4.4. Discussion

The present study tested, and found support for, the hypothesis (H2a) that the relationship between the emotional intensity associated with an event and fusion to one's group is mediated by perceived frequency of reflection on that event and the perceived centrality of the event. The study also found evidence for the hypothesis (H2b) that the relationship between the emotional intensity associated with an event and fusion to an essential belief of the group (in this case the concept God) is mediated by perceived frequency of reflection on that event and the perceived centrality of the event. The results of the study presented in this chapter support the IIS's key assertion, that emotionally intense experiences can promote reflection that results in the event becoming a central aspect of one's personal schema and can result in fusion to essential beliefs of the group's social schema (referred to as conceptual ties). In both the Singaporean and UK samples, perceived frequency of reflection and the perceived centrality of the event were found to have positive effects on fusion with the essential belief God.

The analysis also revealed unexpected differences between the UK and Singaporean samples. While both samples had the same pattern regarding fusion with God (Model 2), different patterns were found regarding fusion with the group (Model 1). Namely, using the data from the Singaporean sample, the pathway where reflection mediates the relationship between emotional intensity and fusion with the group (indirect effect 1) was not found to be significant, however, this pathway was significant in the model analysing the sample drawn from the UK.

This difference could be due to several factors. First, it is possible that one explanation for this pattern may be because during data collection in Singapore one of the most famous Christian pastors in the country was being investigated for embezzlement (Hussain, 2015). This event was quite noticeable and spoken about by church leaders in many churches in Singapore. The negative

scrutiny that Singapore's minority Christian community may have been experiencing may have caused reflection that resulted in an individual distancing themselves from their group. This would assume that in some way, one's identity as a member of a church would be negatively impacted by the actions of another church (as the sample in Singapore did not target the church under investigation for recruitment). As such, it is possible that the participants' identity as a member of a specific Singaporean church are simultaneously affected by their identity as a Singaporean Christian. Therefore, if another sub-group of the Singaporean Christian community does something that could negatively impact one's alignment to the Christian community at large, it would impact the identities of Christians identified with other sub-groups by association. This suggests that future studies may wish to simultaneously deploy measures of social identification and fusion that target multiple identities that could be held by a participant, such as being the member of a specific congregation, being part of a specific nationality, or being Christian in order to investigate the extent to which multiple identities are embedded within one another, or interactive in some way.

The current study also found evidence that euphoric experiences can result in fusion. My ethnographic observations suggest that the emotions experienced by Singaporean and British Christians during reaffirmations, retreats, and conversions are overwhelmingly euphoric; this ethnographic observation is supported by the participants' self-reports. The responses on questions about the intensity of the experience are also consistent with my ethnographic observations in Singapore and the UK. Often, individuals had a story to tell that documented an emotionally intense and life changing experience. Rarely—if ever—would anyone describe their experience as mundane or in a "matter of fact" way. Given both ethnographic experience and the overwhelmingly positive ratings of the experiences reported by participants, it appears that dysphoric arousal is not

a necessary condition for extended fusion. Rather, extended fusion can result from intense euphoric experiences as well, as predicted by the IIS.

This study expands on several previous studies of dysphoric experiences in the fusion literature. The study reported by Jong et al., (2016) found that reflection on an emotionally intense event mediates the relationship between the emotional intensity associated with the event and fusion. Using the data collected here, it was found that reflection mediates the relationship between emotional intensity and fusion using 1) a measure of fusion to the group and 2) a measure of fusion to God in both UK and Singaporean samples. The current study expands on the finding by Jong et al. by demonstrating that reflection can also affect one's fusion with an essential belief. In the original studies, Jong et al. only measured fusion to a social group, not an essential belief relevant to the group's social schema. The current study was able to replicate this effect using slightly different measures of emotional intensity and reflection, however, it is noteworthy that, in the serial mediation models that tested the main hypotheses of the current research, reflection did not have a significant independent indirect effect (indirect effect 1) in Model 2 or the Singaporean data for Model 1 (indirect effect 1 was significant for Model 1 using the UK data). This suggests that, for the formation of conceptual ties that would link an emotionally intense experience with an essential belief from the group's schema, the effect of reflection is important not just on its own, but in conjunction with the additional effect of perceived centrality of event as well. This seems evidenced by the finding that when perceived centrality of event is added as an additional mediator (in Model 2), indirect effect 1 is not significant, while indirect effect 2 (which analysed only the indirect effect of both reflection and perceived centrality of event) and indirect effect 3 (which analysed only the indirect effect of perceived centrality of event) were significant; yet, when

testing the relationships of indirect effect 1 in its own mediation models, the effect of reflection is significant on its own (see Figures 10-13).

The results of the present study also address the findings of Buhrmester, Burnham et al., (2018), who found that the relationship between dysphoric intensity and fusion to one's group is significantly mediated by fusion to a central concept of the group. The current study replicated this effect in the UK, but not in Singapore. This may be related to the results found for testing Model 1, which did not find a significant indirect effect of reflection on the relationship between emotional intensity and fusion with the group in Singapore. It is possible that in the Singaporean sample, their fusion to the group, which was significantly higher than in the UK sample, was premised upon relational ties. The present study did not collect data on the size of the churches that participants attended, so size of the group could not be directly addressed. However, it is possible that the participants in the Singaporean sample came from smaller churches in Singapore and therefore their fusion was also based on relational ties. While studies suggest that many Christians in Singapore do attend large churches, there are many smaller churches that could be bound by local fusion (Chong & Yew-Foong, 2013; Sng, 2003; The National Council of Churches of Singapore, 2004, 2013). Future studies should not only gather data on church size, it should also attempt to investigate if separate measures of local and extended fusion can be validated and deployed in order to separate the potential effects of each type of fusion independently.

The results of the current study also expand on the finding of Buhrmester, Burnham et al., (2018), who found that emotional intensity is related to reflection and perceived centrality of an event. Although the present study used separate measures of reflection and perceived centrality of an event than Buhrmester, Burnham et al., the results of the present study also found that emotional intensity is related to reflection, perceived centrality of an event, and fusion with a group and with

an essential belief of the group. However, the current study used a serial mediation model that suggests that reflection and perceived centrality of an event can have significant indirect effects (both in combination and—at times—independently) on the relationship between emotional intensity and fusion. The results of the current study, in combination with the results reported by Buhrmester, Burnham, et al., suggest that future studies should utilize longitudinal studies (as done by Buhrmester, Burnham, et al.) as well as studies that introduce experimental manipulations to further investigate the relationships between emotional intensity, reflection, perceived centrality of an event, and fusion to both a group and an essential belief for the group.

Potential limitations of this study should also be highlighted. First, the study relies on multiple self-report questions. While these measures were useful, self-report measures can be subject to biases and using alternative measures could be useful in the future. For example, the study measured emotional intensity using a self-report measure. Future research should consider supplementing this with an implicit measure such as galvanic skin response. In addition, the perceived frequency of reflection was also measured by self-report. Future studies could manipulate a participant's frequency of reflection; this could be done using a priming task (for example, Study 3 of Jong et al., 2016). Introducing a manipulation of reflection could help support the IIS's claims that reflection should cause an intense emotional experience to become a central aspect of one's identity and codify conceptual ties. Lastly, emotional valence was also measured by self-report. While my ethnographic observations of high arousal experiences in Pentecostal and Charismatic Christian churches in Singapore and the UK suggest that these experiences are generally euphoric, some experiences may be dysphoric at the time they occur but recalled as euphoric. Examples of this might include experiences such as spiritual healings from an illness or the intense feeling prior to being slain in the spirit. Therefore, future research could use additional

measures of euphoria and dysphoria. For example, euphoria could be investigated using the Positive and Negative Affect Schedule (Watson, Clark, & Tellegen, 1988). Dysphoria could be measured using the Pain Catastrophizing Scale (Sullivan, Bishop, & Pivik, 1995), which has been validated in multiple cultures (Cho, Kim, & Lee, 2013; Solé, Castarlenas, & Miró, 2016; Van Damme, Crombez, Bijttebier, Goubert, & Van Houdenhove, 2002) and with adolescent populations (Crombez et al., 2003).

Another limitation concerns the use of the dynamic identity fusion index, which was used to test for fusion with the concept God. In the past, this measure has been employed to test fusion with abstract concepts such as nationalities (using flags to represent a specific country) and has also been shown to be more reliable than other measures of fusion in previous studies (Jimenez et al., 2015). However its resemblance to the inclusion of self in other scale, which has been well validated as an inter-personal relationship measure (Aron, Aron, & Smollan, 1992), can call into question the extent to which it is better to interpret the results as reflecting the assumption that the scale is measuring a conceptual tie with God as an abstract concept or as measuring a perceived relational tie with an anthropomorphised representation of God. Accepting this latter proposal would appear to support an understanding of fusion more closely aligned with that of Swann et al., (2012) or Whitehouse & Lanman (2014). In this sense, one may be fused to God via a relational tie, which the IIS proposes to be the basis of local fusion. This is different than the idea proposed by the IIS, where God represents a mutually held conceptual tie that has been internalized via reflection (and thus the basis for extended fusion). Further studies may wish to target other concepts that are central to Christians that are not as easy to anthropomorphise (e.g., salvation or grace). In addition, future studies may wish to investigate whether separate measures for local and extended fusion can be developed (as suggested above). Having separate measures for local and

extended fusion could help elucidate if fusion to God is based on local fusion (i.e., a relational tie) or extended fusion (i.e., a conceptual tie).

In conclusion, the results of this study provide evidence for the IIS's formalization of social cohesion, particularly regarding its predictions concerning how fusion could result from high arousal rituals in doctrinal religions. Previous theorists have proposed that extended fusion results from kinship-based cognitive mechanisms and extending *relational ties* to large groups of individuals (e.g., Fredman et al., 2015; Swann et al., 2012; Whitehouse & Lanman, 2014), the IIS approach proposes that extended fusion is caused by reflection that results in mutually held *conceptual ties* between essential belief of a group's social schema and the members' personal schemas. However, the IIS also proposes that that the social schemas are affected by the different forms of group alignment. Specifically, the IIS posits that fusion is the result of reflection on an intense emotional experience that becomes central to one's identity (as suggested by the study presented in this chapter). In alignment with the DMR theory (Whitehouse, 2004a), the IIS proposes that reflection can result in unique belief idiosyncrasies being introduced into the fused individual's semantic memory for the group's social schema that not held by the rest of the group. Meanwhile, attendance at frequent rituals should result in social identification (as discussed in Chapter 3) as well as the formation of social schemas. Therefore, the IIS suggests a positive relationship between frequency of in-group ritual attendance and within-group consensus as well as a positive relationship between social identification and within-group consensus. However, the IIS also suggests a negative relationship between fusion and within-group consensus. Within-group consensus is important because, as discussed in Chapter 2, the social cohesion of large social group can be undermined if its members have different conceptions of what it means to be part of that group. The next chapter expands on the results of the previous two chapters by using field

based semi-structured interviews and modern computational data mining techniques to investigate the relationships between group alignment and within-group consensus.

5. Group Alignment and Frequency of In-group Ritual Attendance's Effect on Within-Group Consensus

Within-group consensus refers to the extent to which the members of a group share beliefs about the group. Sharing an understanding about what the group believes is critical to social cohesion. This is because if one set of individuals is aligned to a group based on the understanding that the group is defined by a specific set of beliefs, while another set of individuals is aligned based on the understanding that the group is defined by some other set of beliefs, then the disagreement between two sets of beliefs represents a point of weakness in the group's social cohesion. Schisms in doctrinal religions offer historical examples of this. For example, the "Great Schism", which marks the split between the Roman Catholic church and the Orthodox church (typically dated to the year 1054), was the result of the fact that there were deep rooted differences in beliefs regarding the source of the Holy Spirit and the role of the Pope, among other theological matters (Cross & Livingstone, 1997). More recently, the Episcopal Church has had hundreds of congregations, that have millions of members when combined, threaten to leave the church because some of the more conservative members do not believe that the church should support same-sex unions or the ordination of openly homosexual bishops (Sherwood, 2016). In these instances, the individuals might still identify as "Christians" or "Anglicans," but the different ways in which sub-divisions of the original group conceive what their group stands for can deteriorate social cohesion within the group to the point of breaking off and forming a new social identity.

Chapter 2 discussed the proposal of the DMR theory and the IIS extension that different rituals can promote different forms of group alignment and how these can, in turn, affect within-

group consensus. On one hand, weekly rituals, such as those held by the overwhelming majority of Christian communities, should result in schemas that are socially shared and can serve as a target for social identification. Taking part in frequent rituals should result in high levels of within-group consensus because an individual has learned the beliefs of the group in a social setting that is partially detachable from their own personal identity (as posited by the principle of functional antagonism), the information presented in the ritual is taken to contain the meaning of the ritual (thus decreasing the need for reflection), and frequent rituals provide an occasion for leaders to correct any unorthodox teachings. On the other hand, emotionally intense experiences should promote reflection, which is proposed by the IIS to have a negative effect on within-group consensus because reflection serves to blend an individual's personal schema with their group's social schema through the formation of conceptual ties. Therefore, when inquiring about the beliefs of their social group, there should be a negative relationship between within-group consensus and an individual's level of fusion, while (on the other hand) there should be a positive relationship between within-group consensus and an individual's level of social identification. The IIS formalizes this as a dual mediation whereby the positive relationship between frequency of in-group ritual attendance and within-group consensus is mediated negatively by fusion and positively by social identification.

However, cultural epidemiology offers an alternative explanation to within-group consensus, which states that beliefs become shared because they spread from person to person. This approach does not necessarily assume that beliefs are transmitted in a way that is analogous to a belief being "copied and pasted" between the minds of individuals who are part of the same social network. Some theorists propose that beliefs are recreated in the minds of individuals each time they are presented and that similar beliefs are found because all individuals share a common

set of cognitive mechanisms that are being used to process the information (Sperber & Hirschfeld, 2006). An epidemiological effect should also be measurable in naturally occurring doctrinal religions. If epidemiological spread is the mechanism behind within-group consensus, pairs of individuals who have a social network link should have greater between-individual consensus. Alternatively, some computational simulations suggest that it is not specific individuals that stabilize beliefs in a social group, resulting in within-group consensus, but the probability of encountering the correct information from other members of their group that results in within-group consensus (e.g., Bryson, 2013). As such, those individuals with greater amounts of connectivity in the group should have greater within-group consensus.

Because 1) this model has multiple pathways, 2) no research has yet tested the complete model proposed by H3, and 3) a potential alternative explanation (from the cultural epidemiology literature) is also tested, this chapter outlines the previous research in three sections. Firstly, I present a review of the previous research relevant to understanding the relationship between frequent repetition of information and within-group consensus. To date, there are few studies that address the relationship between frequent repetition of information and within-group consensus.[20] Secondly, I present previous research relevant to understanding the relationship between group alignment and within-group consensus. Among those studies that have addressed the relationship between group alignment and within-group consensus, they focus on social identification; to my knowledge, the relationship between within-group consensus and fusion has never been investigated. Lastly, I present the previous research relevant to whether within-group consensus

[20] Only a single study (Hermans & Mooij, 2010; discussed below) investigates this hypothesis in regards to frequent in-group ritual attendance in doctrinal religions, drawing upon the theoretical framework of the DMR theory (Whitehouse, 2004a).

can be achieved by epidemiological processes. Finally, I discuss why the city-state of Singapore provides a uniquely appealing setting for the present research before presenting the current study, results, and discussion.

5.1. Previous Research: Frequent Repetition and Within-Group Consensus

Eldridge, Bernard, and Bekerian (1994) investigated how repeated events can lead to schemas of information for daily work experiences. They employed a semi-structured interview which included asking individuals to recall a typical day at work, what they did the day before, and what they did 1-week prior. The researchers recorded the basic activities reported by participants to be part of their "typical day" and compared the responses with their recollections for the day before and the week prior. The results showed that there were fewer details recalled for the daily routine of the prior week than that of the day before. They also found that the details that were recalled for the prior week were largely drawn from the schema for a "typical day." As such, their research suggests that frequency of in-group ritual attendance should support the formation of social schemas in a group and thus within-group consensus. However, Eldridge et al., (1994) did not test to what extent (if any) the frequency of performing tasks at work correlated with within-group consensus between employees, rather, consensus is left to be assumed because the participants were drawn from the same group.

A more recent study set out to investigate the extent to which there was within-group consensus regarding the causes of diabetes among members of an Anishinaabe[21] community in Canada (Garro, 2000). Garro utilized an interview as well as a survey of 68 yes/no questions concerning the causes of diabetes. The analysis revealed that there was a reasonable amount of

[21] The Anishinaabe are an indigenous group in North America. They are commonly known by those outside of their own community as Ojibway.

within-group consensus among the members of the community. After controlling for guessing, Garro reported that approximately 84% of the answers were shared among the members of the community, representing a very high amount of within-group consensus. It was also found that curers, considered to be more knowledgeable about the group's schemas, did have significantly higher levels of within-group consensus than those who were not curers. In this way, the research does address the shared nature of within-group consensus in a way that Eldridge et al., (1994) did not. Regarding how within-group consensus forms, Garro assumes that it is constructed over time through multiple experiences and conversations with other members of their group, which is largely congruent with the views of the IIS and the DMR theory. The fact that curers, who would presumably be more frequently exposed to issues about diabetes, have higher within-group consensus suggests that there is a positive relationship between frequency of exposure to information and within-group consensus about that information.

In a study concerning the relationship between in-group ritual attendance and the development of schemas that could lead to within-group consensus, Hermans and Mooij (2010) investigated "to what degree is reproduction of the proportion of elements of a sermon influenced by…. Church attendance…" (Hermans & Mooij, 2010, p. 222), which they relate to the hypothesis of the DMR theory that individuals who frequently attend ritual orations, such as sermons, will recall more elements of the doctrine. In principle, assuming all individuals are attending the same ritual, the information they recall should be the same, thus resulting in greater within-group consensus. Their study focused on a sample of congregants from a single Catholic church ($N = 77$). Hermans and Mooij utilized a Sunday sermon presented to the sample as a target for a recall task. This task's aim was to measure how many aspects of the sermon an individual could remember. In their analysis, it was revealed that those individuals who attended church weekly remembered

fewer aspects of the sermon than those who attended less frequently. This appears to run counter to the predictions of the DMR theory and the IIS. The reason for this finding is potentially due to the study's methodology, which only presented the sermon once to the participants. While participants were asked how frequently they attended on a scale from "every week to now and then" (Hermans & Mooij, 2010, p. 217), this does not measure how frequently the participants were exposed to the teachings presented during the experiment, which for all participants would be once. Although it is possible for a single idea to have been repeated multiple times in the sermon, thus increasing its frequency of presentation to a participant, this was not analysed by Hermans and Mooij. Therefore, their measures are not sufficient to address the appropriate variables proposed by DMR, which would be frequency of exposure to the beliefs—through in-group ritual attendance—(IV) and the formation of semantic memories for information presented during the rituals (DV). As such, the research protocol appears to investigate episodic—not semantic—memory. Hermans and Mooij asked individuals to reproduce specific elements that may have been unique to the sermon presented during the study, and this study was only presented once. As the sermon's details are unlikely to have been consolidated into semantic memory after a single experience, there is reason to assume that the information would be accessible for semantic recall. Therefore, specific information presented in the sermon is unlikely to be available for a participant to recall. The analysis revealed that 54.5% of the participants did not remember any element mentioned in the sermon and most participants remembered only one or two (out of 14) of the target doctrinal elements addressed by the study; only a single participant reproduced half of the experimental targets. The authors also reported that all participants claimed to remember something from the sermon and "everything that they report[ed] is indeed part of the teachings of the Catholic Church, but it did not reflect the content of the sermon" (Hermans & Mooij, 2010, p.

221). This result is what one would expect when examining the specific details of an episodic experience and aligns with earlier experimental and ethnographic research (cf. Xygalatas, 2012).

Hermans and Mooij's (2010) study, while important to the literature relevant to the current study at least because it is the only study in the literature attempting to empirically test the relationship between frequency of in-group ritual attendance and within-group consensus within the framework of the DMR theory, did not address the extent to which the beliefs were shared among members, only the extent to which their reproduced information matched the experimenter's a priori coding scheme; as such, information that would have fallen outside the scope of their coding scheme would not have been measured. Future research should use more flexible measurement techniques to overcome these limitations (as discussed in Section 5.5).

5.2. Previous Research: Group Alignment and Within-Group Consensus

The IIS posits a positive relationship between social identification and within-group consensus. In previous literature, studies typically focus on the beliefs of individuals, assuming the beliefs to be shared, and overlook within-group consensus. Nevertheless, because shared schemas are posited to be the basis of within-group consensus by both the DMR and the IIS, studies investigating the relationship between identification and the development of group beliefs at the individual level bear relevance to our understanding of within-group consensus in doctrinal religions.

Early research by social psychologists found mixed support for the relationship between within-group consensus and social identification. While some studies have found evidence for the relationship, others either found no support or overlooked the role of within-group consensus as motivation for identification. The first study to provide empirical support for the relationship between within-group consensus and social identities tested whether having some similarity with

other individuals would lead individuals to align themselves with a group more than those who were only assigned to a group category (Billig & Tajfel, 1973). Identification was measured by the endorsement of more pro-group behaviour and groups were formed using an experimental method commonly known as the 'minimal group paradigm' (MGP). As discussed in Chapter 2, the MGP involves assigning individuals to a group with which they have no previous affiliation; often letters or numbers are used to refer to that group (e.g., group 1, group 2, group A, group B). In their research, Billig and Tajfel (1973) used a 2 X 2 factorial design whereby participants were categorized or not-categorized in a MGP, and either told they were in a group of people with similar beliefs to their own or randomly assigned. In the beginning of the experiment, participants were asked to rate artwork produced by two painters (Klee and Kandinsky). Participants were assigned to groups and told that the paintings were painted by Klee or Kandinsky (similarity manipulation) but in the non-similarity condition they were not told anything about the artists. They then participated in an economic game where they were told that the other participants were assigned a number based on their affiliation as liking either Klee or Kandinsky; this was used to create the minimal group categories. In fact, these groups were assigned randomly, participants were just told that the groups were assigned based on similar responses (Billig & Tajfel, 1973, p. 33). The results of the experiment revealed that individuals expressed greater in-group favouritism based on categorical definition than within-group consensus[22] as measured by awarding greater amounts of money to in-group members. Although in-group favouritism was greater in similarity conditions than the non-similarity conditions, this difference was not statistically significant. This led Billig

[22] In their original publication, Billig and Tajfel use the term "similarity" but in order to avoid confusion by having two terms for the same construct, I use the term within group consensus. As such, "similarity" is used to refer to the condition in their study where participants were given similar information.

and Tajfel to conclude that categorization, rather than within-group consensus, was the basis for the participants' alignment. In short, they did not find evidence for the relationship between identification and within-group consensus as proposed by the IIS.

Wilder and Allen (1974) aimed to replicate Billig and Tajfel's (1973) study with one slight change—namely, they grouped participants by the similarity of their ratings to other participants (recall that Billig and Tajfel assigned their groups randomly). This allowed them to more directly examine the effect of within-group consensus on ingroup and outgroup favouritism, which serves as a proxy for social identification as it did in Billig and Tajfel's study. Wilder and Allen reported that individuals who had been categorized displayed significant in-group favouritism regardless of within-group consensus. However, Wilder and Allen also reported that participants *within a group* were more favourable towards more similar participants and less favourable toward less similar participants. Their result suggests that when within-group consensus is used as a measure—rather than a group marker in a MGP—participants with greater within-group consensus exhibit behaviours that suggest that they have greater social identification.

Billig and Tajfel's research was also partially replicated by Hewstone, Fincham, & Jaspars (1981). However, Hewstone et al., utilized out-group punishment, instead of favouritism, as a measure of group alignment. Hewstone et al., used an almost identical protocol to that of Billig and Tajfel; the difference being that they measured how much money a participant said should be taken from members of an outgroup instead of measuring how much money an individual gave to members of their group. Their results revealed that individuals exhibited in-group favouritism in the non-categorization-similarity condition and Hewstone et al., reported that the effect in the categorization-non-similarity condition was "marginally significant" ($p < .10$). The previous study by Billig and Tajfel (1973), only found significance in the categorization-non-similarity and

categorization-similarity conditions. As such, Hewstone et al., partially replicated the results of Billig and Tajfel. However, where Billig and Tajfel ruled out within-group consensus as a basis for group behaviour on statistical grounds, Hewstone et al., were unable to do so.

The complex results of these studies suggest that a more nuanced approach to the relationship between social identification and within-group consensus may be warranted. The results described above suggest that social categories are powerful targets to which individuals can align themselves, but the strength of that alignment is, at least in part, affected by the importance an individual prescribes to the beliefs that are used to define their group. Additionally, it is also possible that the different results reported above are the result of a methodological issue: the way in which the protocols in both studies manipulate within-group consensus is similar to how they manipulate categorization. Both the Billig and Tajfel (1973) and Hewstone et al., (1981) studies employ the standard protocol of the MGP when assigning group affiliation in the categorical manipulation. However, in the "similarity" condition, individuals are not actually assigned to groups based on any actual within-group consensus. Rather, the participants are randomly assigned and led to infer within-group consensus with the other members of the group. From an experimental standpoint, this is not a huge issue for Billig and Tajfel because the individuals were not directly interacting with other participants, they were basing their decisions exclusively on perceived categorical membership; this is not the case in the Hewstone et al., study, where the experiment was run in a single room without cubicles separating participants (see Hewstone et al., 1981, p. 102). However, it may be significant for both experiments that there is no reason to assume that there was any congruence between the participant's group assignment and their actual beliefs. Current social identity literature holds that a group's identity should be a significant aspect of one's self-concept. The extent to which one believes the group is a positive and central aspect of their

lives is so crucial to the construct of social identity that it is currently included in some measurements of social identification (e.g., Leach et al., 2008). As discussed in Chapter 2, social psychologists define social identification as alignment with social category one attributes to themselves because it allows them to maintain a positive self-image. Furthermore, it is posited that a person's identification with a social category is based on a perceived congruence between the beliefs an individual uses to construct their self-concept and the stereotypical beliefs that define a group (Hogg & Abrams, 1988). As such, the MGP may be problematic when attempting to assess the role of within-group consensus because there is no guarantee that the beliefs that one holds regarding an experimental stimulus are a significant aspect of their social identities. Therefore, there is little reason to expect significant changes in a participant's social identification. If this is indeed the case, and no manipulation check was performed in previous research to show that it was not, we can state that MGPs induce categorical identifications more efficiently than within-group consensus *per se*. However, we cannot state that the results of Billig and Tajfel (1973) and Hewstone et al., (1981) conclusively rule out within-group consensus as a significant aspect of social identification since their "similarity" manipulation was in fact a secondary minimal group category. This limitation could be remedied by utilizing samples drawn from naturally occurring groups where the individuals are identified as members of the social category on their own accord, outside of any experimental protocol.

Postmes, Spears, Lee & Novak (2005) investigated the relationship between within-group consensus and group alignment using a novel computer-mediated experimental method. The study addressed two identity formation types, which Postmes et al., refer to as inductive and deductive. They define *inductive identity* as one where the social identity is based on information gathered from social relationships and *deductive identity* as one where the social identity is based on within-

group consensus (this shares a notable resemblance to alignment by fusion and social identification respectively). They propose that when no information is available individuals derive norms from other individuals in the group (inductive identity) but when information about the group is available, individuals deduce norms from the social group (deductive identity). They also propose that individuals are affected by being *individuated,* or identifiable and socially known by other group members, and *depersonalized,* [23] or anonymous in their group. In their experiment, participants were asked to participate in a group discussion about a target topic.[24] The researchers manipulated participants (N = 72: 24 groups of 3) by having them state their name and personal information in the individuated condition, while in the depersonalized condition participants were instructed to only give opinions about the target topic. As such, their study manipulated identification in a way that distinguishes between identities based on shared relationships and identities based on within-group consensus. In the deductive identity condition, participants were given information about the group but in the inductive identity condition experimenters provided no information about the group.

After being put into their respective groups, the participants were instructed to have a conversation about the target topic. Overall, Postmes et al., (2005) found significantly different response patterns in each condition. Those who were in the deductive identity condition provided less information about the target topic during the group conversation than those who were in the inductive identity group. However, there was no significant difference in the number of on-topic

[23] In the publication, Postmes et al., use the term deindividuated, but its definition is the same as the term depersonalized, as used in the DMR theory literature. As such, I use the term depersonalized for clarity.

[24] The target topic was “internet regulation”, which piloting revealed to be a relevant topic for the sample.

contributions to the discussion between the individuated and depersonalized conditions. The fact that there were more words spoken in the shared identity groups suggests that individuals in the individuated condition produced more off-topic information than those in the depersonalized condition. This would be expected if the content the participant provides is the result of retrieving information from semantic schemas that they have related to their group. The results of Postmes et al.'s study support the claim that there is a relationship between the beliefs one has and identification. In particular, it seems that in the individuated condition, where individuals could rely on relational ties—similar to those believed to underlie local fusion—for social cohesion, there appeared to be less within-group consensus than ingroups in the depersonalized condition, that had to rely on a social schema—associated with social identification—for social cohesion. It is worth noting that Postmes et al., also observed that individual attitudes became more polarized in the individuated-inductive condition and in the depersonalized-deductive condition. This reported polarization is interesting considering "the fact that there was no explicit demand of the experimenter to come to an agreement—group members were left entirely free during the discussion phase" (Postmes et al., 2005, p. 753). This seems to suggest that attitudes vary less in small groups that utilize interpersonal relationship to bind the group and in groups where beliefs alone, without any interpersonal relationship, are used to define a group. This finding is important because it seems to suggest that bonding by relational ties (i.e., local fusion) and bonding by categorical ties (i.e., social identification) may be stable attractors for within-group consensus. This supports the IIS's prediction that social identification should be positively related to within-group consensus. Additionally, it suggests that the IIS's prediction that fusion is negatively related to within-group consensus is wrong. However, this interpretation is limited because it would only apply to local fusion as described by the IIS, since local fusion is proposed to be reliant on

relational ties while extended fusion is reliant on conceptual ties, which did not have a clear approximation to any of the conditions discussed by Postmes et al.

The Postmes et al., (2005) study appears to suggest that, in the depersonalized condition, individuals derive information from their group as the group represents the most salient source from which to learn the relevant information, while in the individuated condition, individuals derive information from other members of the group. However, this does not explain why participants in both conditions began to form some amount of within-group consensus. Although this effect may be expected in the depersonalized condition where all the participants derive their knowledge of the group from the same place (the categorical identity assigned to the group), this effect would not be expected in the individuated condition. Ceteris paribus, one would expect that individuals who are unique members of a small group would not need to form any within-group consensus. Given that their identification could be based on relational ties this is unnecessary. However, the effect may be the result of the experimental protocol. The method employed by Postmes et al. forces the participant to reflect upon their own beliefs and express them to a group. It is possible, in principle, that by expressing these beliefs the individuals are indirectly creating ties with other members of the group that are based on between-individual consensus (not necessarily a mutually shared social categorization based on within-group consensus) *in addition to* the relational ties manipulated by the experimental protocol. As such, this apparent within-group consensus could be the result of epidemiological effects of transmitting information from person to person. This finding could also be interpreted as suggesting evidence for the DMR theory's claim that idiosyncratic beliefs can be effectively transmitted in small groups bound by social relationships (as discussed in Chapter 2, Sections 2.1 and 2.3).

Some of the shortcomings in the research reviewed above could be addressed by recruiting participants from naturally occurring groups. These groups would provide salient and central identities that would vary in strength among the members. Using naturally occurring groups would also overcome some of the limitations of the MGP discussed above and the ethical and logistical issues that may be involved in devising an experimental protocol that could induce fusion within a large social group. If it is the case that emotionally intense experiences are required for fusion, then it is difficult to imagine an ethical experimental protocol that would enable researchers to effectively induce fusion in a group relevant to understanding a doctrinal religion. In naturalistic groups, where there is a shared schema of information, one could possibly observe within-group consensus among individuals and measure their levels of group alignment. Naturally occurring groups also provide the opportunity to investigate within-group consensus. However, one major issue with studying within-group consensus in naturalistic groups is the difficulty in tracking how it is that individuals encountered the information being measured. While it is likely the case that individuals in a religious group hold religious beliefs because of their attendance with the group, it is conceivable that they have learned religious beliefs from people outside of their own group. Learning the beliefs of a group through more passive exposure (such as observing evangelists or being presented with religious pamphlets on the street) is possible, particularly in relation to doctrinal religions such as Christianity that often encourage members to talk about religious beliefs to others. Therefore, an ideal research location for using naturalistic groups to study within-group consensus of religious beliefs would be one where religious speech is regulated or there is little public presentation of religious beliefs.

5.3. Previous Research: Cultural Epidemiology and Within-group Consensus

A great deal of the literature addressing cultural epidemiology has utilized advanced mathematical or computational models to investigate how concepts can stabilize when they are spread from one person to another (e.g., Bryson, 2013; Centola, González-Avella, Eguíluz, & San Miguel, 2007; Henrich, 2001; Henrich, Boyd, & Richerson, 2008). Other research in the field of cultural epidemiology uses historical and real-world data to investigate the spread of technologies and innovations throughout a cultural group (e.g., Boyd, Richerson, & Henrich, 2013; Mesoudi & O'Brien, 2008). However, it is rarer for research to analyse data gathered from real-world groups to examine within-group consensus of beliefs within the framework of cultural epidemiology. This may be due to the difficulties in tracking individual concepts as they spread from person to person. Many studies of cultural epidemiology do not focus on within-group consensus in culture but instead focus on cumulative culture. *Cumulative culture* is a "particular kind of social learning, which allows for the accumulation of modifications over time, involving a ratchet-like effect where successful modifications are maintained until they can be improved upon" (Caldwell & Millen, 2008, p. 3529). Nevertheless, there are studies focusing on the spread of beliefs that suggest that cultural epidemiology may be a plausible mechanism for the development of within-group consensus.

In one such study (Abel, 2015), 32 university students in Taiwan were instructed to keep a diary of conversations that they have over a three-week period. During this time, over 4,000 conversation topics were recorded, however, any topic that did not occur at least five times was not included in the final analysis. This resulted in 37 topics. Participants were also instructed to include the date, time, and other participants in the conversation. This allowed for transmission to be inferred by the social connections and time associated with a conversation. By analysing the

data recorded in the journals, it was found that topics were being spoken about in ways that could be described epidemiologically—as topics co-occurred in journals of multiple participants with time-stamps showing that on instance of transmission preceded another. In addition, the author plotted out the frequencies with which topics occurred over time. This led to the observation that many topics were brought up in recurrent cycles over time (i.e., their frequency increased and decreased cyclically over the three-week period) and noted that cyclical increase in a topic's prevalence often coincide with that topic's prevalence in larger scale systems beyond just conversations (such as university discussions and national news programs). One shortcoming of this research is that it did not compare within-group consensus of the topics recorded among the participants, only the frequency with which information about topics was transmitted and when the transmission occurred. The author concluded that "shared knowledge" or "the emergence of shared 'culture'" (Abel, 2015, p. 463) on a topic is likely because of information being presented multiple times, and that because information is transmitted not just by individuals, but also by news sources, suggested future research needs to focus on the different mechanisms for information transmission more specifically.

The second study utilized field surveys and self-reports of network ties in 3 native Maya populations (the Itza', Ladinos, and Q'eqchi') to investigate the effects of cultural epidemiology on the within-group consensus of beliefs about plants and animals in their environment (Atran et al., 2002). To measure the beliefs of the group, the researchers used cards with printed with pictures of 28 plants and animals from the local environment. They then asked participants to match each of the 28 plant cards with any animals that "searched for," "went with," or "were companions of" the target plant and if the plant hurt or helped the animal (Atran et al., 2002, p. 428). From this data, the researchers used principle components analysis to determine if a single underlying model

of cultural relations was discernible from the data. The researchers then calculated within-group consensus based on the number of similar responses between individuals, controlling for guessing (Atran et al., 2002, p. 428; this technique was origionally developed by Romney, Weller, & Batchelder, 1986). To construct the possible transmission networks, the authors asked two questions. The first question asked participants to name seven people outside of their household that are the "most important to your life," which was used to create a contact based social network. The second question asked participants to name "to whom you would turn to find out something that you do not understand about the forest," which was used to create an expert network (Atran et al., 2002, p. 432). The researchers found that in all three groups, the social networks were very isolated (that is to say, there were few connections between the communities). The analysis of the contact based social network revealed that Itza had no links outside their group while Ladinos named one Q'eqchi', and Q'eqchi' named one Ladino (to clarify, this does not mean there were only one connection between them, rather multiple Ladinos named the same Q'eqchi' and multiple Q'eqchi named the same Ladino). However, expert networks were more connected. The researchers found that the expert networks for 6 of the top 10 Ladino experts had Itza' experts listed more often than Ladino experts. The authors focused their analysis on between-group patterns of consensus. However, they also reported that, among the Ladinos and Itza' participants, that gender and expertise were reliable predictors of within-group consensus (they did not report coefficients in their analysis that could suggest relative effects of adding these variables to their analysis). As a result of the number of links in the expert network of Ladinos who cite Itza' participants as experts, the authors concluded that information from the "socially well-connected male Ladinos converge toward the consensus of Itza' experts" (Atran et al., 2002, p. 434). However, it is important to note that the authors also caveat their findings by suggesting that, because of the

selective copying of beliefs observed during the field research, the Ladinos learn from Itza' experts by "inference rather than imitation" (Atran et al., 2002, p. 435).

The results of the studies by Atran et al., (2002) and Abel (2015) suggest that contact between individuals in groups can result in the spread of information. However, Atran et al., (2002) found that the number of connections predicted within-group consensus. Based on this, a hypothesis (AH1) can be devised to investigate cultural epidemiology further; namely, there is a positive correlation between one's total network degree and their within-group consensus (as discussed above, this is also suggested by Bryson, 2013). However, this would be different than testing if there is greater between-individual consensus among connected individuals. If, in fact, beliefs are spread by contact, then one could hypothesise (as AH2 of this study does) that there is greater between-individual consensus with those individuals that a participant is connected to than those with which there is no connection. Both hypotheses (AH1 and AH2) will be tested in the study presented in Sections 5.5 and 5.6 of this chapter. Prior to presenting the study, a brief discussion of Singapore, which served as the field site for this research is presented.

5.4. Singapore as a Context for Investigating Within-Group Consensus

Singapore provides a unique research context for the study of religious beliefs. Singapore is a small city-state in Southeast Asia with a population of approximately 5.5 million and its citizens are generally regarded as having an extremely high quality of life (Lai, 2008). Since Singapore's independence from Malaysia in 1965,[25] it has been a secular country with no official state religion that has carefully avoided any policies that would favour any one religion. Due to Singapore's history with evangelism by its minority Christian community during the 1980s being

[25] Singapore's independence came approximately two years after Singapore was emancipated from British control and federated with Malaysia in 1963.

viewed as offensive to some, Singapore has introduced controls on the ability for individuals to publicly display or discuss religious beliefs (E. K. B. Tan, 2008). Since Singapore enacted "The Maintenance of Religious and Social Harmony Act" in 1990, the state has exercised control over how religious information is spread, even to the point of limiting the speech of religious leaders and practitioners (D. P. S. Goh, 2010). Unlike in the United States or UK, religious individuals will not be found evangelizing in the street or discussing their beliefs with individuals who do not explicitly approve of the conversation. Also, unlike countries such as the US or UK, evangelism is not found on standard television networks; individuals generally have to pay for channels broadcasting religious messages. As a result, most churches disseminate any live-broadcasts (or recordings) of their sermons or Sunday Services via the internet. This restricts the learning of most religious beliefs to two areas of life in Singapore: one's own experience with religion and the general beliefs and practices taught during primary and secondary school.

Since Singapore's independence, it was believed that the state should teach moral values and that this could be done by teaching the basic tenants of the religions in Singapore (R. B. H. Goh, 2005; Sng, 2003). In Singapore, this includes 11 explicitly defined religions, of which Christianity, Islam, Buddhism, and Confucianism are discussed in the Singaporean public-school curriculum. Students are taught deliberately vague overviews, as the state is careful to separate itself from the notion that it endorses any religious tradition. However, schools affiliated with religious traditions, particularly Methodist and Anglican Christianity, have been regarded as some of the more prestigious schools in the country and accept students of all religious backgrounds. Students in religious schools in Singapore are given religious education in the school's religious tradition that is more thorough than that of the public schools, however, the government is not tolerant of schools espousing negative views on other religions. Generally, religious education in

the schools of Singapore results in a citizenry that is somewhat knowledgeable about other religions, but does not know much about the beliefs of other communities, much less the theological subtleties that would result from frequent attendance as part of a community (D. P. S. Goh, 2010; E. K. B. Tan, 2008).

5.4.1. Christianity in Singapore

In Singapore, Christianity is about 20% of the population and growing, particularly among educated and upwardly mobile[26] sections of the population (Chong & Yew-Foong, 2013). Throughout Singapore's history, the churches have been a provider of social services such as orphanages, hospitals, and schools (Poon & Tan, 2012; Sng, 2003), and this is still the case today. One primary context for the spread of Christianity in Singapore is in schools and universities. Although there are strict policies about public evangelism in Singapore, peer to peer discussions between colleagues and acquaintances are generally unhindered so long as they are done in a respectful and non-threatening manner. This has allowed for para-church organizations to leverage social networks of educational institutions to spread their beliefs and invite potential converts to church events (Hinton, 1985; Sng, 2003).

Using educational social networks has been crucial to the spread of Christianity. While the government closely regulates religious speech and evangelism in general public spaces (as described above), the face to face social networks that form in educational institutions are largely unregulated unless a group offends another religious group or disturbs the general peace between people in a public space (see J. Lim, 2012). This has been the case at least since Christianity started

[26] In Singapore, this term refers to those individuals born into working class families with low educational attainment in the previous generation, who are better educated (i.e., university or college educated) and have higher paying jobs than their parents.

to grow among the ethnically Chinese demographic of Singapore's population in the 1970s. During this period, Pentecostal and Charismatic worship styles also began to spread quickly throughout churches in Singapore (Sng, 2003). The spread of Pentecostal and Charismatic worship styles started within the Methodist church in 1972 when a group of boys, who were enrolled at the Methodist-affiliated Anglo-Chinese School at Barker Road, met in the clock tower of church to pray and began speaking in tongues;[27] this became known as the "Clock Tower Revival" (Poon & Tan, 2012). This revival was marked by members of the Christian community showing *signs and wonders*. Signs and wonders commonly include speaking in tongues, being "slain in the spirit," faith healings, and the casting out of demons.[28] As the Clock Tower Revival spread to Anglican and Catholic congregations, churches began performing charismatic services in addition to traditional liturgies (Sng, 2003). In the charismatic services, the general format of the service still included prayers, sermons, hymns, offerings, and the holy communion; however, individuals would begin to speak in tongues during prayers or hymns and—at times—would be slain in the spirit. Today, a subtle partition in the Christian community in Singapore exists between the charismatic and non-charismatic worship styles in mainline protestant churches. Many denominations, such as the Methodist Church, have accommodated Charismatic worship by performing both charismatic and traditional services. Other denominations, such as the

[27] This phenomenon, called glossolalia, is considered by Pentecostal Christians to be a blessing of the Holy Spirit and is common in Singapore's Charismatic churches (Adam, 2003); however, glossolalia is uncommon in many mainline denominations such as Methodism, Lutheranism, Presbyterianism, or Anglicanism.

[28] Signs and wonders also include being unburnt when touching fire and the handling of snakes. To my knowledge both of these phenomena are undocumented in the history of Singaporean Christianity. To this day, it is rare for any leader to perform exorcisms, but this was reported to have happened at home-based prayer groups during the period following the Clock Tower Revival (M. Tan, 2014).

Presbyterian and Lutheran churches in Singapore, only offer services which follow traditional liturgies (The National Council of Churches of Singapore, 2013).[29]

Outside of mainline protestant churches, Singapore has seen a notable increase in attendance at charismatic mega-churches since the late 1980s (Sng, 2003). Churches such as New Creation Church, Faith Community Baptist Church, and City Harvest Church have thousands of attendees per service. The largest of these churches, New Creation Church, sees a weekly attendance of over 30,000 people (Matthews, 2014) and has built Singapore's largest indoor auditorium (The Star Auditorium; see Figure 16) to accommodate services of up to 5,000 people at a time (see Figure 17). This is significant when one takes into account that the largest of the Protestant denominations in Singapore is the Methodist Church (M. Tan, 2014), which has a total membership of slightly less than 50,000 (Lane, 2014). These churches are marked by both their charismatic worship services and their large congregations. During a worship service, individuals will often speak in tongues and it is not uncommon for a pastor to perform faith healings. Unlike most mainline churches, traditional liturgies are not offered. For example, at New Creation Church, a typical service consists of the following; about 30 minutes of praise and worship songs; a reading of announcements and miracles associated with the church; a sermon lasting about 1 hour; collection of offering during a special performance by a member of the church; and a final performance of praise and worship songs. The entire service typically lasts approximately 2 hours.

[29] The only notable exceptions in these churches being "youth services", which are services that utilize contemporary Christian music instead of traditional hymns, but such services do not encourage signs and wonders and I am unaware of any Singaporean church in the main Presbyterian or Lutheran tradition which have reported signs and wonders in a youth service.



Figure 16. The Star Performing Arts Centre from Bueno Vista MRT Station. This building serves as the main church meeting place for New Creation Church. It also meets at several other public meeting places throughout the city, such as the Marina Bay Sands hotel and casino and many local movie theatres, where sermons are broadcast live 4 times each Sunday.



Figure 17. The congregation at typical Sunday morning service of New Creation Church at The Star Auditorium. The venue seats 5,000 attendees and is billed as the largest indoor auditorium in the country.

Most Singaporean churches have vibrant social schedules for their congregants. For example, at New Creation Church, individuals are encouraged to join bible study groups of 20 or so other individuals in their age group. These bible study groups meet weekly for official functions and often throughout the week for dinners, sports, or to attend events together (Hinton, 1985; Matthews, 2014; Sng, 2003). Mainline churches often utilize the cell structure if their congregation supports it. If not, ministries are created as subgroups working within the church. In both mainline and charismatic churches, it is not uncommon for members to invite friends to their bible study group either for official events or for casual gatherings. Such invites are a common way for individuals to become introduced to a new church in Singapore. Inviting one's peers to attend a church event is encouraged by most churches in Singapore. Individuals are encouraged to extend invitations both to Christian and non-Christian peers (Hinton, 1985; Sng, 2003). This creates an atmosphere where it is not uncommon for a young Singaporean Christians to attend a church that is not their *home church*, or the church they typically attend, in response to an invitation from a peer.

To review, there are several ways in which an individual can encounter Christian doctrine in Singapore. However, due to regulations and social pressures, individuals would not encounter Christian doctrine indirectly (e.g., by overhearing a street evangelist). Within Christian communities, individuals primarily receive information about their group's beliefs from structured events associated with their church. While conversations of doctrine do come up in casual conversations during social events, they are generally short and sporadic. However, one source of information is also attending rituals at other churches.

Singapore provides a unique context for testing the effects of ritual attendance and group alignment on within-group consensus as well as alternative hypotheses regarding cultural

epidemiology (AH1 and AH2). This is because, as described above, most individuals are exposed to Christian teachings from their in-group and the environment of Singapore—unlike that of western countries such as the US or UK—generally does not include public images or artefacts in public. The low number of Christians relative to the total population and the restrictions on evangelism allow for greater certainty that individuals are receiving information only from their own church. Therefore, individuals are less likely to learn the beliefs of other religions by accidental exposure in their day to day life. In addition, the performance of rituals with low emotional intensity in many mainline churches, as well as rituals with high emotional intensity in the mega-churches allows for the research to investigate both typical (high frequency-low emotional arousal) doctrinal ritual as well as the emotionally intense rituals that are noted as problematic for the DMR. The presence of both ritual styles provides a useful field-site for testing the claims of the IIS (as discussed in Chapter 2).

As outlined in Chapter 2, repeated low arousal ritual performances can spread information efficiently by facilitating consolidation into complex schemas in semantic memory. Within the context of Singaporean Christianity, this would happen at Sunday Services. Unlike the small group gatherings facilitated by many churches, which are deliberately kept to 15-20 individuals, Sunday Services can be attended by thousands or tens of thousands of individuals on any Sunday. As individuals attend these rituals over years and decades, the information becomes codified into complex schemas of information, stored in semantic memory. In what follows I present the results of a new study, undertaken in Singapore, that was formulated to address the limitations in previous research to directly test hypothesis H3.

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5.6. Results

This study collected data in order to test hypothesis (H3) as well as two alternative hypotheses (AH1 and AH2) from the cultural epidemiology literature, the results of which are discussed after the results of testing H3 below.

Responses showed acceptable levels of consistency on the social identification (α = .82) and fusion (α = .80) measures. Data revealed that 87.9% reported attending their home church "About Once a Week" (N = 25) or "Several Times a Week" (N = 4). There were significant differences between the congregations regarding fusion (*Mann-Whitney U* = 71.50, p = .02), with the mega-church (*mean rank* = 20.79) being greater than the mainline church (*mean rank* = 12.97). There were no significant differences found between the congregations regarding their frequency of in-group ritual attendance (*Mann-Whitney U* = 120.50, p = .58), social identification (*Mann-Whitney U* = 101.00, p = .22), or within-group consensus (*Mann-Whitney U* = 121.00, p = .05). Means, standard deviations, and medians are provided in Table 8 below.

Table 8

Descriptive statistics for frequency of in-group ritual attendance, within-group consensus, fusion to the group, and social identification.

Variable	*M*	*SD*	*Mdn*	*Skewness*	*Kurtosis*
Frequency of in-group ritual attendance	5.88	0.86	6.00	-2.29	6.81
Within-group consensus	.01	.01	.01	4.33	19.63
Fusion to the group	4.56	0.90	4.43	0.34	0.03
Social identification	5.91	0.74	6.00	-0.78	0.41

In order to test the main hypothesis (H3), an SEM was constructed in R using the Lavaan package (Rosseel, 2012). The SEM investigated if there is a significant relationship between frequency of in-group ritual attendance and within-group consensus as well as independent paths between frequency of in-group ritual attendance and within-group consensus that go through social identification and fusion with the group. To analyse the SEM, a maximum likelihood estimation with robust standard errors and a scaled test statistic were used. This is applicable for models that would violate the assumption of normality and can increase power of SEMs with small sample sizes compared to other methods (Bentler & Yuan, 1999; Rosseel et al., 2018). Due to the non-normal distribution of the data, non-parametric bootstrapping (with 1,000 bootstrapped samples) was used. The model was significant $\chi 2(1, N = 32) = 9.44$, $p < .01$, *AIC* = 40.81, *RMSEA* = .54, *95% CI for RMSEA* = [0.25, 0.82], *CFI* = .79; the model converged normally after 32 iterations. The standardized regression weights with their confidence intervals can be found below in Figure 19.

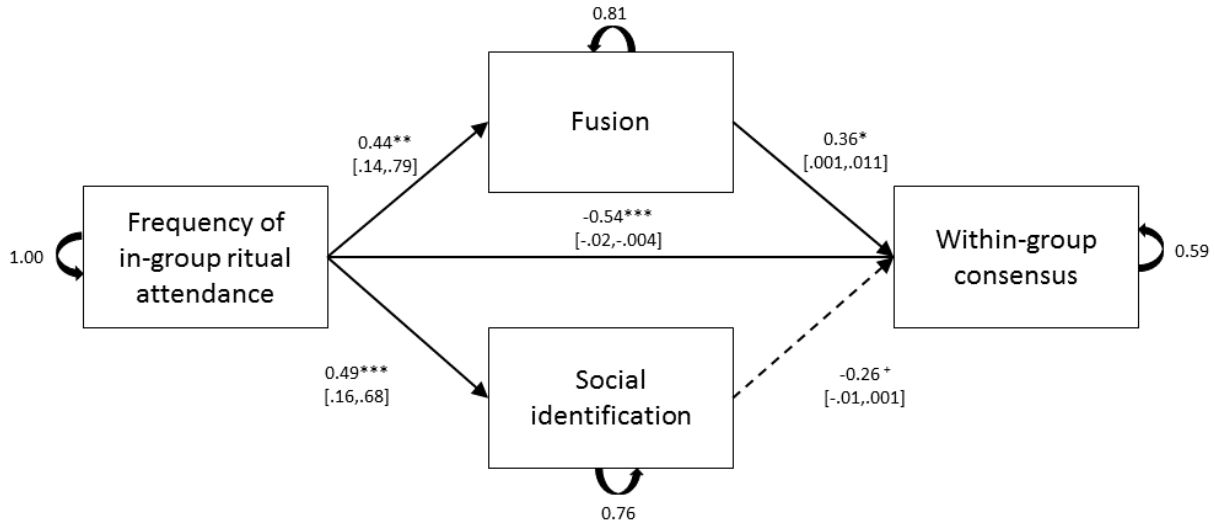


Figure 19. Results of SEM. Each relationship is depicted with standardized regression weights and 95% confidence intervals (shown in square brackets). The solid arrows denote significant relationships in the SEM, the dotted arrow between Social identification and Within-group consensus denotes that it did not achieve significance with α = .05 (note that this α is reporting the significance level used in the analysis, not Cronbach's alpha)*. The looped bold arrows represent the error coefficients. Symbols are used to denote significance levels: *p < .05; **p ≤ .01; ***p ≤ .001; +p = .09.*

While analysis revealed that this model was significant and converged normally, convention states that one should have at least 10 observations for each variable to achieve reasonable power of an SEM (Westland, 2010). The rules of quantifying the power of a SEM are not as established as they are for more traditional statistical methods (Westland, 2010). However, a *RMSEA* > .06 suggests that the model may be significant, but it is not a high-quality fit (see Westland, 2010; Wolf, Harrington, Clark, & Miller, 2013). In addition, the CFI, which is a fit index of an SEM that compares the specified model to a baseline model with the same structure but assumes no correlations between variables (Fan, Thompson, & Wang, 1999), was found to be low. Analyses of models of this structure suggest that sample sizes of 100 should be sufficient in future research (Wolf et al., 2013). This is addressed further in the discussion.

5.6.1. Testing the alternative: social network position and within-group consensus

While earlier analyses included $N = 33$ participants, there were 4 additional participants that provided social network data and completed the interview but did not complete all measures on the survey. As such, their data was excluded from analyses above, but their data is included here to increase the sample size, resulting in a sample of $N = 37$. The total degree (number of social ties for each participant) was scaled to the size of each sample, allowing measures of total degree to be more directly comparable between groups. The total degree measure of the sample followed a non-normal distribution ($M = 0.07$; $Mdn = 0.05$; *skewness* = 1.73; *kurtosis* = 2.85). Most individuals have very low total degree, while a few have much higher total degree; this is typical of human social network data (Clauset, Shalizi, & Newman, 2009; Newman, 2005). There were no significant differences for total degree between the groups for either the scaled (*Mann-Whitney* $U = 127.00$, $p = .40$) or unscaled (*Mann-Whitney* $U = 134.00$, $p = .53$) total degree measure.

For visual reference, the social networks are presented in Figures 20 and 21 below. The node colour is scaled from lowest (blue) to highest (red) relative to the number of connections that they have in the network (i.e., their total network degree). Both network visualizations were produced using the ORA software package (Carley, 2013).

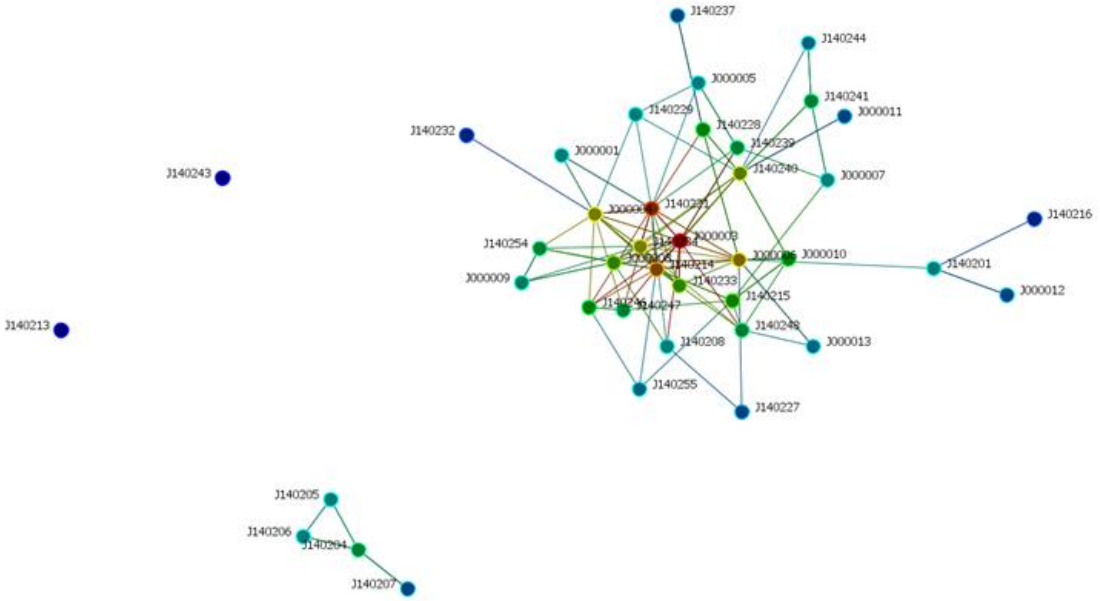


Figure 20. Congregation 1 - social network (described above as a mega-church). The node colour is scaled from lowest (blue) to highest (red) relative to the number of connections that they have in the network (i.e., their total network degree). The nodes are labelled by participant number; those nodes with participant numbers formatted as J14xxxx participated in the survey, those with participant numbers formatted J00xxxx were listed as social contacts but did not participate in the survey.

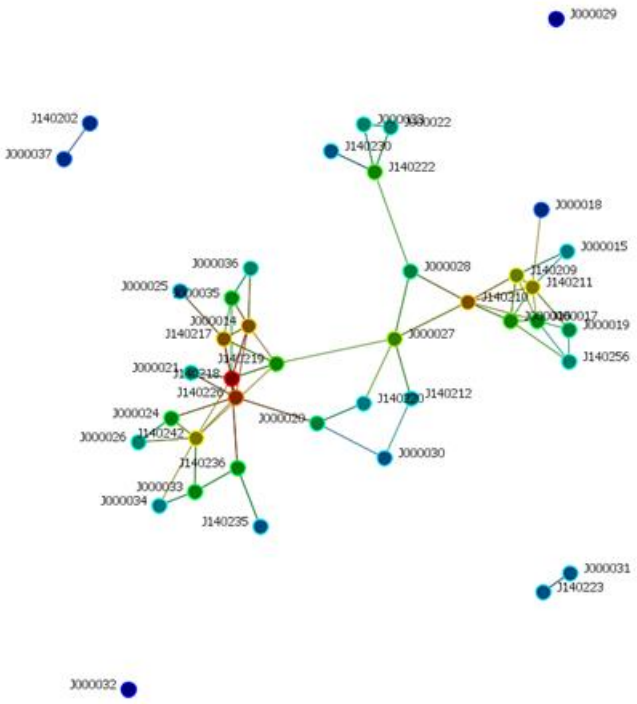


Figure 21. Congregation 2 - social network (described above as a mainline church). The node colour is scaled from lowest (blue) to highest (red) relative to the number of connections that they have in the network (i.e., their total network degree). The nodes are labelled by participant number; those nodes with participant numbers formatted as J14xxxx participated in the survey, those with participant numbers formatted J00xxxx were listed as social contacts but did not participate in the survey.

The analysis of the data also tested hypothesis AH1. No correlations were found between the distance to the Lossy Intersection and in-degree (r_s = -.05, p = .84, *95% CI:* [-.49, .38]), out-degree (r_s = .07, p = .79, *95% CI:* [-.38, .52]), betweenness (r_s = .13, p = .61, *95% CI:* [-.38, .56]), network eigenvalue (r_s = .09, p = .75, *95% CI:* [-.41, .47]), or local clustering coefficient (r_s = .21, p = .41, *95% CI:* [-.27, .63]). Post-hoc analysis revealed that the analysis did not use a sample size great enough to find acceptable power when calculating power given the greatest effect observed

in the study (power = .25 assuming the effect sizes and sample reported above); future studies should use a sample size of at least 284 in order to achieve acceptable power of .80.

Due to the non-normal distribution of both the Euclidian distances and social network links, as well as the relatively low sample size, hypothesis AH2 was analysed using Mann-Whitney U test with Monte-Carlo estimations. Mann-Whitney U tests are a non-parametric alternative to a t-test (Lumley, Diehr, Emerson, & Chen, 2002) that has been used in Sections 4.3 and Section 5.6 to test for significant differences between samples.[32] The Monte-Carlo method provides a way of estimating accurate p-values with small samples, missing data, non-normally distributed data, or if the data do not meet the assumptions for standard statistical procedures (Besag & Clifford, 1989). The Monte Carlo method is a repeated sampling method (similar to bootstrapping) that samples the observed data to create simulated datasets. This then provides maximum and minimum p-values for the target statistical procedure given all samples. For this analysis, the Monte Carlo method simulated 10,000 samples from the observed data. This provides exact estimations of the p-values as well as upper and lower bounds on all p-values calculated from the simulated sampling procedure. This analysis used the standard cut-off of .05 for statistical significance and a 2-tailed test. The analysis revealed that none of the participants showed significantly more between-individual consensus with their social ties than their non-social ties. The results of statistical testing

[32] Typically, t-tests are acceptable for larger samples even with non-normally distributed variables, particularly if bootstrapping methods are employed (as discussed in Lumley et al., 2002). Other non-parametric alternatives to the t-test are the Kolmogorov-Smirnov Z-test, Wald-Wolfowitz Runs test, and Moses Extreme Reactions test. These are inappropriate given the data types in the analysis. The Kolmogorov-Smirnov Z-test tests uses a cumulative distribution from the two variables and tests if the maximum overall difference in the distribution of two groups is significant—the Mann-Whitney test is a rank-order statistic, making it more appropriate given the data here; the Wald-Wolfowitz Runs test is used for testing on ordinal variables—the data here is not ordinal; the Moses Extreme Reactions test tests if an independent variable affects the dependent variable in a positive or negative manner—here I am interested in significant differences.

for all participants (including 1-tailed tests) can be found in Appendix 4.2. Post-hoc power analysis (completed using g*power; Faul et al., 2007) revealed that this study did not use a sample size great enough to find acceptable power when calculating power given the average effect observed in the study (*power* = .08). For the power analysis, the averages of all participants were used (their data can be found in Appendix 4.2); the power analysis assumed group 1 N = 15.636, group 2 N = 3.091, group 1 *mean* = .003, group 2 *mean* = .004, group 1 *SD* =.001, and group 2 *SD* = .002; if future research aims to find a similar effect, it should use a sample of at least 278 individuals to achieve an acceptable power of .80.

5.7. Discussion

The IIS proposes that the relationship between frequency of in-group ritual attendance and within-group consensus is positively mediated by social identification and negatively mediated by fusion. The study presented above used an innovative method for quantifying ethnographic field interviews in order to study within-group consensus in real-world social groups. However, post-hoc analyses revealed that the study was underpowered. The SEM analyses attempted to address this by utilizing the best estimation methods available given the small sample size and distribution of variables and supplemented the estimation methods with bootstrapping (as discussed in Section 5.6). Nevertheless, future research should use larger samples to increase power of the SEM, which would be noted by an acceptable RMSEA as well as an increase in the CFI (as suggested by Bollen, 1989). I implore the reader to keep in mind that this discussion acknowledges that the study has this limitation, however, we can utilize some of the statistical trends uncovered in this analysis to guide our analysis for future research.

Despite its statistical limitations, the data suggested that both the pathway from fusion and the pathway from frequency of in-group ritual attendance to within-group consensus were of the

direction predicted by the IIS. In addition, the relationship between social identification to within-group consensus had the predicted (positive) relationship. These trends in the data suggest that future research should be done, but do not allow for any statistically backed conclusions due to the study being underpowered.

The IIS posits fusion's weak negative effect on within-group consensus to be the result of reflection on personally salient events (as discussed in Chapter 4), which can blur the boundaries between personal and social schemas. Within the fusion literature, studies have shown that those individuals with high levels of fusion are more committed to their group, as evidenced by their endorsement of greater sacrifices for the group and greater willingness to engage in extreme behaviours directed at outgroups (Bortolini et al., 2018; Gómez & Vázquez, 2015; Swann et al., 2010, 2012, Whitehouse et al., 2017, 2014). If the current study's results are replicated with a greater sample size, it could find evidence for the IIS' proposed negative relationship between fusion and within-group consensus, opening the possibility that those who are more fused do not always hold the same view concerning the meaning of what constitutes their group's essence, despite being some of the more committed members of the group.

This study also investigated two hypotheses drawn from cultural epidemiology, neither of which found statistically significant results. However, given the sample size of this study, it is not a valid conclusion to suggest that cultural epidemiology has no effect. In addition to the study being underpowered, there are additional reasons that the study would not have found significant results. It could be that, the effect of cultural epidemiology cannot be easily captured in a synchronic statistical analysis, or that the synchronic analysis was unable to capture the effects of the transmission effectively. Scott-Phillips (2017) suggests that stability of representations, such as that expected in groups with high within-group consensus, can result from re-construction of

representations in the mind due to the similar cognitive architectures that all naturally developed humans possess. This is also discussed at length by Bryson (2013) in regards to agent-based simulations of cultural epidemiology and cultural stability that assume modularity. Two additional possibilities that would result in an inability to detect the effect of cultural epidemiology could be 1) that the information has already reached a natural equilibrium within the two groups prior to the data being collected and 2) that information was transmitted by individuals who were not included in the sample. Future studies could address the first issue by implementing the techniques presented here within longitudinal research protocols that do not use naturally occurring groups in attempt to capture information as it stabilizes in a group over time. The second issue above could possibly be addressed by analysing data from online social networking platforms that are used by church groups, such as Facebook, Twitter, or WhatsApp.

This study contributes to the research literature by demonstrating the use of an innovative and efficient method for quantifying schemas and within-group consensus from semi-structured interviews in a way that can be extremely useful in future research. This study statistically modelled tested predictions by quantifying schemas as complex networks of representations drawn from multiple participants within a social group. By combining aspects of cognitive anthropology (e.g., Whitehouse, 2000, 2004a; Whitehouse & Lanman, 2014), social psychology (e.g., Hodges et al., 2013; Swann et al., 2012; Tajfel & Turner, 1986), and informatics (e.g., Carley & Palmquist, 1992; Hill & Carley, 1999) into a single methodological framework, this research set out to scientifically measure within-group consensus by comparing semantic network maps of semi-structured interviews done in the field with naturally occurring groups.

If we accept that fusion, the group alignment style that results in extreme group commitment, also results in less within-group consensus, it can help us to interpret schisms in

doctrinal religions. In this case, a schism would be the result of a subset of a doctrinal religion that are fused to their identity beginning to believe that their own beliefs are the "true" beliefs for the religion. Their idiosyncrasies may be similar enough to converge into a novel social schema; however, this new social schema may be dissonant with the social schema of the general body of members in the group. Religious schisms that result from a subset of a group believing that they hold the original or "true" faith can be found throughout the history of religions. Two relevant and well documented examples include the Fundamentalist Church of Latter Day Saints, who left the Mormon church (Singular, 2008) and the Branch-Davidians who left the Seventh Day Adventist Church (Newport, 2006; Tabor & Gallagher, 1997). Both traditions were the result of a sub-set of the group leaving to preserve their more conservative or "true" understanding of their original group's beliefs. If one accepts this argument regarding religious schisms, researchers should be clear to delineate that while two groups may have the same nominal social category, one group may have significantly different beliefs from another group with the same name. This also opens the possibility that there could be individuals with high levels of fusion to their group but low levels of identification to the social category, which we can refer to as the *apostate effect*. This would be possible because a subset of individuals in the group become fused to a target essential belief (or set of beliefs) of the group while other individuals, who are acknowledged to be in the same social category do not hold the target beliefs to be essential. This could lead to those individuals who don't hold the target beliefs to be essential to be considered illegitimate members (or apostates) of the group by those who do hold the target belief to be essential. The apostate effect should be investigated in future research. One way to do this would be to sample individuals from sub-communities within a large group (such as Christianity) and measure fusion to the ideas that are essential to the group (which are likely to vary in their intensity within different sub-

communities) and social identification to the entire group (i.e., the social category at large). The apostate effect may be marked by individuals who have high levels of fusion to a group and its concepts, but low levels of social identification with others who identity as members of the same group.

There are several additional potential future directions for the present research beyond replicating the studies presented here with larger sample sizes. For example, more testing of the IIS is necessary before it can be accepted as a cognitive explanation for extended fusion. One potential method that could supplement those used here is a reaction time task, such as the implicit association task (IAT), which has been used to study the relationship between one's self and their alignment with other beliefs, people, and groups (Aron et al., 1992; Hodges et al., 2013; Sharp et al., 2015; E. R. Smith et al., 1999; Trump & Brucks, 2012; also discussed in Chapter 4 of this dissertation). This could provide a more thorough understanding of the relationship between concepts and group alignment by asking whether target concepts are related to a social group and recording response latencies. Such a dataset could also provide further validation of semantic network mapping as a useful model of schemas.

The IIS states that emotionally intense experiences in doctrinal religions can promote reflection that results in extended fusion (based in conceptual ties, as opposed to the local fusion proposed to bond members of imagistic religions based in relational ties). Examples of such practices include the practices of contemporary Pentecostal and Charismatic Christian communities (like the mega-church studied in this chapter), as well as historical revivals and revitalizations such as the "Great Awakenings" of in US history and Whitehouse's observations of the schism group of the Pomio Kivung (Whitehouse, 1995, 2000, 2004a). The research presented in this chapter suggests that the IIS may offer an innovative explanation for several critiques that

assert that the presence of emotionally intense experiences in doctrinal religions are irreconcilable within DMR (e.g., Clark, 2004; McCauley & Lawson, 2002; Paden, 2004; Wiebe, 2004).

6. General Discussion and Future Directions

The current research set out to better understand how doctrinal religions maintain social cohesion. Particularly, this research aimed to address the effects of emotionally intense experiences in doctrinal religions such as those found in contemporary Pentecostal and Charismatic Christian churches. These traditions are problematic for the DMR theory because the theory predicts that emotionally intense rituals in doctrinal religions will die out. However, Pentecostal and Charismatic Christians represent a large percentage of the world's largest doctrinal religion and demographic models and surveys suggest that they are growing in many regions (Miller & Yamamori, 2007; Pew Research Center, 2011). Yet, Pentecostal and Charismatic Christian traditions appear to rely on high frequencies of in-group ritual attendance at low arousal rituals as well as rare emotionally intense experiences. Overall, the theoretical integration, studies, and semantic network mapping method presented in this dissertation represent three significant contributions to the current literature on social cohesion and the role of high arousal experiences in doctrinal religions.

To better address how different emotionally intense events can facilitate social cohesion in doctrinal religions, the DMR theory was extended to incorporate how schemas of information are constructed over time and how reflection on emotionally intense events can significantly impact one's schema and alignment to a doctrinal religion. This extension, which I refer to as the IIS, allows the DMR theory to account for emotionally intense rituals in doctrinal religions, such as the kinds of rituals practiced by Pentecostal and Charismatic Christians. The IIS builds a clear bridge between the DMR theory on the one hand, and social identity theory and fusion theory on

the other by extending the recent proposal connecting the three theories presented by Whitehouse & Lanman (2014). It extends their theoretical integration by proposing a new form of tie that underlies extended fusion called a conceptual tie. The IIS proposes that conceptual ties result from an individual having an emotionally intense experience that prompts reflection on the event. As a result, the event becomes more central to their identity as the individual uses the social schema of their doctrinal religion to interpret the experience. This reflection results in links between an individual's personal schema and essential beliefs in the group's social schema. This tie between one's personal schema, from which they derive their personal identity, and essential beliefs that define the group can create a porous boundary between one's personal and social identity, which we can call extended fusion.

In order to find evidence for the IIS, three hypotheses were investigated. The first hypothesis (H1) was that frequency of in-group ritual attendance is positively correlated with social identification when controlling for fusion. A study using a large cross-cultural survey, which included participants from the US, UK, India, New Zealand, and Singapore, was used to test the hypothesis (presented in Chapter 3). The survey found that there was a positive relationship between frequency of in-group ritual attendance and social identification. However, the effect of fusion was far greater than expected, suggesting that fusion is also a major aspect of group alignment in doctrinal religions. The study also found an unexpected interaction effect whereby the positive relationship between frequency of in-group ritual attendance and social identification was not as strong for individuals with higher levels of fusion in comparison with individuals with lower rates of fusion. This suggests that there are imagistic-like effects present in doctrinal religions in multiple regions of the world and confirms the need to have an empirically testable

explanation for lasting doctrinal religions that incorporate emotionally intense experiences into their tradition.

The IIS proposes that the extended fusion, which could account for the unexpected effect of fusion discussed above, is due to conceptual ties. In order to find evidence for the IIS's proposal, a second survey was distributed to a sample drawn from the UK and Singapore to better understand the relationship between emotionally intense experiences in doctrinal religions and extended fusion. This survey collected data to test the claim that the relationship between the emotional intensity associated with an experience and fusion was mediated by the participant's perceived frequency of reflection on the event and the perceived centrality of the event. Critically, in this study, two targets for fusion were used. The first was participants' religious group. The other was the concept God. These two targets are important for the IIS because the IIS suggests that extended fusion is the result of conceptual ties, where important aspects of the individual's social group are incorporated into their own personal schema. As such, the concept God was chosen because it is an essential belief for Christian communities. The results found evidence for both the model where the group was the fusion target and where the concept was the fusion target. However, when the model used fusion with God as its target, the analysis revealed that there was no independent indirect effect of reflection. However, there was a significant indirect effect of reflection *and* the perceived centrality of event. Earlier studies have found that reflection does have a significant (and mediating) effect on the relationship between emotional intensity and fusion (Jong et al., 2016). In addition, when using the data gathered for the study to test similar mediation models to those presented by Jong et al., (2016) significant results were found. This suggests that adding the perceived centrality of event is an important mediator of this process. In addition, the study was able to find evidence that replicates the findings of Buhrmester, Burnham et al., (2018), who found

that the relationship between emotional intensity and fusion to a group is mediated by fusion to a concept that is important to the group (in their case the group was a conservation group and the concept was a lion that the group was studying that was killed). The present research supplements that of Buhrmester, Burnham et al., by suggesting a specific structure by which emotional intensity, reflection, and the perceived centrality of an event come to affect fusion to a group or an essential belief of the group.

Lastly, a third study investigated the effects of frequent in-group ritual attendance and group alignment on within-group consensus. This study tested the hypothesis (H3) that the relationship between frequency of in-group ritual attendance and within-group consensus is mediated a) positively by social identification and b) negatively by fusion. First, the IIS suggests that frequency of in-group ritual attendance should serve to consolidate information into schemas that are shared throughout a social group. As such, there should be a positive relationship between frequency of in-group ritual attendance and within-group consensus. The IIS also suggests that fusion and social identification should have opposite effects on within-group consensus. On the one hand, the IIS posits a positive effect of social identification on within-group consensus because social identification is premised on one's alignment to a social category that shares their beliefs, attitudes, and values and the social schema that defines the group is learned socially through repetitive presentation of information at frequent ritual events (a position drawn directly from the DMR theory literature; e.g., Whitehouse, 1995, 2000, 2004a; Whitehouse & Lanman, 2014). On the other hand, because fusion is premised upon a blurred boundary between one's self and their social group and is posited by the IIS to be the result of one's reflection on a personally salient emotionally intense experience, the reflection and inability to separate one's unique personal schema from their social schema should result in a negative effect on within-group consensus.

There is also an alternative explanation for within-group consensus that was tested; namely, that proposed by cultural epidemiology. As outlined in Chapter 2, cultural epidemiology posits that beliefs in a group spread through person-to-person contact, like a game of telephone. Cultural epidemiology differs from the DMR theory and the IIS because cultural epidemiology focuses on the effect of inter-personal contact that spreads beliefs like viruses to explain within-group consensus, while the DMR and IIS focus on the role of ritual attendance as a way of supporting the formation of semantic memories. There are two ways that this research interpreted the cultural epidemiology literature to form testable hypotheses. The first (AH1) is that there is a positive correlation between one's total network degree and their within-group consensus. This assumes that the stability of within-group consensus is the result of individuals coming into contact with a lot of people in their group and therefore being more likely to be exposed to the right information, in line with the suggestion of researchers such as Bryson (2013). A second interpretation (AH2) is that there is greater between-individual consensus with individuals that a participant is connected to than those with which there is no connection. This interpretation is slightly more literal, as it looks specifically at the relationships in a social network.

In order to test the model of within-group consensus proposed by the IIS, as well as that proposed by cultural epidemiology, this research utilized field surveys that collected data on social identification, fusion, and frequency of in-group ritual attendance in conjunction with a semi-structured interview that probed the beliefs of participants and gathered data on social relationships in two churches in Singapore (one mega-church and one mainline protestant church). In addition, social network data was collected from participants.

Using a structural equation model (SEM), the results found that the relationship between frequency of in-group ritual attendance and within-group consensus was mediated positively by

social identification and negatively by fusion. This model found a positive relationship between frequency of in-group ritual attendance and within-group consensus and the expected negative relationship between fusion and within-group consensus. However, the relationship between social identification and within-group consensus, despite being positive as predicted, only had a significance of $p = .09$. Furthermore, the cultural epidemiology hypotheses were both tested, and the data supported neither hypothesis. However, post-hoc analysis revealed that the study was under-powered. Possible ways to address this are discussed further in the section on future directions. Despite being underpowered, this study furthers the use of SEMs in the field of anthropology. Given that the field often deals with complex constructs and theories that can often have multiple causal pathways, SEM is a useful tool that has been increasingly used in recent decades (Nachtigall, Kroehne, Funke, & Steyer, 2003), but seems underutilized in Anthropology.

One of its most significant contributions to the literature is how this research quantified within-group consensus using data-mining algorithms to analyse unstructured text data drawn from a field interview to construct computational approximations of an individual's schema; this is discussed further in the next section. In the past, researchers have often relied on a participant's similarity to group responses on likert scales (e.g., Atran et al., 2002; Tastle & Wierman, 2007) and other ordinal measures in order to attempt to quantify within-group consensus (such calculations are often used in the literature on group decision making; e.g., Chiclana, Tapia García, del Moral, & Herrera-Viedma, 2013; Tapia Garcı´a, del Moral, Martínez, & Herrera-Viedma, 2012). The present research contributed to the anthropological literature by applying a method previously unused (to my knowledge) in anthropology by analysing semi structured interviews with the lossy intersection distance developed by Kathleen Carley to measure the within-group consensus represented in a sample of networks that represent socially held information (Carley,

1997; Hill & Carley, 1999). Semi-structured interviews have been used by clinical psychologists and anthropologists in the past in order to get freely offered information from individuals in a more controlled fashion than unstructured interviews. At the same time, semi-structured interviews are also not bound by a set of pre-determined questions in the way that survey measures are. However, the quantification of semi-structured interviews has largely been done through coding schemes and human coders in the literature to date. By introducing semantic network mapping as a method for quantifying the structure of information in a semi-structured interview, this thesis has been able to demonstrate the use of this technique for answering anthropological questions and opens up many future directions for this research.

Largely, future directions fall into two categories: (1) methodological—future research can embrace and extend the use of data mining techniques in the field of anthropology; (2) theoretical—future research can use the empirical findings to generate new research hypotheses that can serve to create a more accurate scientific understanding of how religions work. What follows is a discussion of these future directions, addressing the status of the research that is currently employing some aspects of this dissertation.

6.1. Methodological Directions

The tools used and developed to quantify unstructured text data in the present research (particularly Chapter 5) can be expanded upon to incorporate larger datasets from digitized sources. Like other forms of computer-based text analysis, semantic network mapping is scalable. The analyses performed here were the result of analysing networks created from the interview transcripts of a relatively small sample of individuals. However, in other venues, I have presented how we can utilize the technique to analyse the networks drawn from a corpus of over 500 digitized historical religious texts and sermons by employing parallel computing algorithms run on a high-

performance computing system (Lane, 2015b). This demonstrated that the technique can be used to answer questions of interest to anthropologists by scaling the analysis onto larger computational architectures; for example, those available to academic (and private) research institutions such as the ARCUS (University of Oxford Advanced Research Computing, 2015), NOTUR (UNINETT Sigma AS, 2015), or private cloud computing services offered by Amazon (Amazon Web Services Incorporated, 2015) Google (Google LLC, 2018), and Microsoft (Microsoft Corporation, 2016).

An additional example of the use of this technique to study semantic networks drawn from doctrinal religious communities is currently being completed with funding by the John Templeton Foundation, as part of the Singapore Religion and Spirituality Project and the Modeling Religion Project. The research used a custom web-mining program developed using the Python programming language (Python Software Foundation, 2015) to collect over 145,000 sermons from the internet; mostly from American congregations. This data included the text of the sermon, the denomination, the name and location of the church, the pastor who gave the sermon, the date the sermon was archived, the themes of the sermon, and the biblical passages the sermon addresses. From the location of the church, the state or province can be recorded and thus any relevant census division or region; this allows the data to be interpolated against census data. This represents the largest digitized collection of religious orations by a project aimed at studying religious concepts. The texts of the sermons included in this dataset are currently being analysed the semantic network mapping techniques discussed in Chapter 5. This corpus can facilitate many avenues for future research. For instance, social schemas between churches, denominations, and geographic locations can be compared over time. These social schemas can also be analysed in relation to other socio-demographic variables such as census data, political affiliation, or variations in social norms (Gelfand et al., 2011; Harrington & Gelfand, 2014). Since the data are also longitudinal, they can

be used to investigate the changes within a group over time as it encounters different social and political perturbations. Preliminary analyses have shown significant changes after events such as the attacks on September 11, 2001 and the 2008 financial crisis in the content and structure of Christian sermons (preliminary results were presented at the IACSR2016 conference in Vancouver Canada; Lane, 2016).

In the future, the semantic network mapping technique used in this dissertation can also be employed to analyse human subjects' data available on online social networks such as Facebook. Online social networks store massive amounts of texts in the form of shared web pages, posts, responses, and status updates. Currently, Facebook has 1.44 billion active users, 936 million of which are daily users, and 82.8% of these users are outside the US and Canada (Facebook, 2016). This potentially provides a research sample that includes many doctrinal religions (not just the Christian traditions discussed in this research) as well as new and emerging religious traditions. In addition, the large population of users outside of the US and Canada can help address the bias of using subjects from western educated industrialised rich and democratic countries noted in the psychological literature (Henrich, Heine, & Norenzayan, 2010). Online social networks represent a great research opportunity because they provide cross-cultural data from social groups that can be quantified both in terms of their conceptual output (i.e., user provided updates and data in the form of updates, comments, and replies to other users) and their social context (i.e., the network of contacts the individual has as well as their physical locations). Analysing the data from online social networks would provide both the social network and conceptual information needed to perform more robust studies of within-group consensus and cultural epidemiology, such as those presented in Chapter 5.

Computational techniques for quantifying text data can also be used to understand doctrinal religions from a historical perspective. Despite the fact that texts have become digitized for computational analysis only relatively recently, efforts to digitize all of the world's books are currently underway (Aiden & Michel, 2014) and millions of books have already been digitized (Michel et al., 2010). Digital corpora provide a massive opportunity to employ the methods used in the present research to study the information produced in relation to doctrinal religions over longer periods of time. In the future, research could employ semantic network mapping to study how it is that essential beliefs of doctrinal religions are presented over time.

The prospects for future research using the computational methods discussed in this research are bright. The cost of the computational systems needed to realize the expansions into ever-increasing data sources proposed above is steadily decreasing. Meanwhile, the availability of data through digitized archives, databases, and online social networks is increasing. This trend couples well with the fact that there are many questions in the field of anthropology that address important contemporary social issues. Often, anthropologists have studied questions of great importance, such as how different contexts affect the beliefs and social cohesion of different groups throughout the world. The techniques developed here can allow for the traditionally qualitative comparisons of anthropologists to be supplemented with quantitative analyses that can support—or refute—their qualitative understandings.

Many questions of interest to anthropologists often focus on a particular group in a particular time and the researchers might not be interested in general models of explanation, but instead are interested in ways to better describe some cultural phenomena. Here too, I believe that semantic network mapping can be useful as it can structure the data collected in the field by anthropologists in a way that could potentially distil and structure field notes and interviews (that

would otherwise take days or weeks to read or listen to) and represent it as a searchable and analysable structure that can help to provide a deeper understanding of a target group or phenomenon. In this way, the same algorithms from big-data analyses can be applied to smaller social groups (such as those assessed in Chapter 5) to answer questions by looking deeper into a relatively smaller dataset.

6.1.1 Ethical concerns

Computational studies of online and offline social networks using the methods discussed in the present research might (and I would suggest that they should) raise ethical concerns among anthropologists, who traditionally put extreme emphasis on data and informant protection. The issue of ethics is complex and multifaceted. However, I believe there are two clear points that can serve to begin the discussion of the ethical implications of the present research, particularly focusing on the ability to quantify religious and cultural beliefs and measures of within-group consensus.

The first is data protection and ensuring that participant data is not leaked or made vulnerable to individuals who would steal or seek to gain unauthorized access to the data. Modern data security practices, such as splitting the dataset across multiple locations and utilizing multi-factor authentication systems, can be used to ensure that the intimate details of a study which would probe one's personal religious experiences would be treated appropriately and with the utmost care (see Lane, 2015a for further discussion of data protection concerns for anthropologists).

The second is ethical misuse of the algorithms used to process the text data and create measures of within-group consensus. In contemporary society, our lives are increasingly lived "online", particularly with online social networks such as Facebook, Reddit, and Twitter having billions of daily users posting about their daily lives and discussing their beliefs and values. In

countries such as China, new online social networks have been increasing in popularity; for example, WeChat and Sina Wiebo have approximately 1 billion and 340 million active monthly users, respectively (BBC News, 2017; Culpan, 2018). On both platforms, Chinese government authorities have played a role in censoring speech that is considered dissident or problematic for the Communist party, such as speech about corruption, and users have attempted to circumvent these censorship policies (Whitmarsh et al., 2013). In addition, WeChat's terms of service clearly state that they provide data access at the request of the government (Tencent Holdings Limited, 2019) and in the past, private communications from WeChat has been allegedly used as evidence in the prosecution of people labelled "political dissidents" by the Chinese authorities (see Davison, 2012). As such, it is logistically possible that governments such as China could use algorithms, such as those used to construct the semantic networks in Chapter 5, to process the data and target individuals with beliefs on the basis of their within-group consensus. Although this idea may seem dystopian, reports from the Xīnjiāng area of China (including satellite images; see Doman, Hutcheon, Welch, & Taylor, 2018; Sudworth, 2018) suggest that up to 1 million Uighurs (a Turkish Muslim minority in China) and other ethnic minorities are being put in concentration camps for "re-education" and forced labour in response to differences in their identities (both religiously and culturally) with the Communist ruling party (Buckley & Ramzy, 2019; Kuo, 2019). This practice is expanding and allegedly reliant on surveillance to decide potential targets for detention, causing many, including the United Nations, to condemn this behaviour as it may lead to genocide of the Uighurs (Cronin-Furman, 2018; Eve, 2018; Staff agencies in Geneva and Beijing, 2019). While this news is disturbing, in its own right, it is exacerbated by news of China's new—and often misunderstood—"social credit system," which uses AI and big-data techniques to monitor and rate citizens based on their behaviours. While the system is not as centralized or advanced as is often

believed (Horsley, 2018; Kobie, 2019), it does force us to ask hard questions about the potential misuse of research methods like those used in Chapter 5, particularly when deployed on the massive scales that online social networking platforms could provide. The example of China may be a particularly immediate one due to the suggestion that it may be a massive human rights abuse. However, the idea of collecting data on a massive scale where text analysis algorithms could be misused is not unique to China and indeed, European and North American defence and intelligence agencies have been known to share data for defence and security reasons (Ball, 2013).

On their own these two ethical issues are quite daunting, and there are other ethical issues in the field of data analytics regarding the field of AI that also go beyond the scope of the current research. Thankfully, there is an active debate among scholars from many fields on the ways that we can utilize different positions from philosophy of morality and ethics combined with regulation, oversight, knowledge of best practices and standards to help address these issues and—ideally—pre-empt possible misuse of technologies that use data mining to infringe on civil liberties (Bryson, 2018; Bryson & Winfield, 2017; Floridi & Taddeo, 2016; Gilbert, Ahrweiler, Barbrook-Johnson, Narasimhan, & Wilkinson, 2018; Pentland, 2014; Schneider, 2009). While this debate has been largely overlooked in anthropology, arguments have been put forward that, because of the new research contexts that big-data platforms like online social networks provide as a supplement to traditional fieldwork, anthropologists need to be engaging in these debates as well (Lane, 2015a).

6.2. Theoretical Directions

There are multiple ways in which the present research can be extended to better understand social cohesion in doctrinal religions. One direction involves further investigation of doctrinal religions from the perspective of the DMR theory. The second is by extending DMR to address other theories, namely, devoted actor theory, which is a combination of fusion theory and sacred

values theory (Atran, Sheikh, & Gómez, 2014; Gómez et al., 2017; Sheikh et al., 2014; Sheikh, Ginges, & Atran, 2013; Sheikh, Gómez, & Atran, 2016). A third direction of future research involves producing a better understanding of social schisms.

6.2.1. Future directions for the DMR theory

The empirical and theoretical advancements discussed in this dissertation can be built upon to address other aspects of the DMR theory, which largely go unaddressed in the present research because they are beyond its scope. For example, the present research focuses on the psychological aspects of the IIS insofar as they implicate doctrinal religions; the dissertation only addresses imagistic religions insofar as they provide a basis for contextualizing some of the empirical and ethnographic observations regarding rare and emotionally intense experiences. However, in developing the IIS in such a way that it can address rare and emotionally intense experiences in the context of doctrinal religions, it opens the possibility to address imagistic religions as well. This could help researchers better understand historical transitions from imagistic to doctrinal systems (or vice versa).

Some researchers have proposed that the transition from imagistic to doctrinal religions was a major force during the Neolithic transition, which is the point in human history where humans transitioned from small scale tribal arrangements largely reliant on hunting and gathering to large scale polities that leveraged complex social hierarchies and agriculture to manage larger and denser populations (Whitehouse & Hodder, 2010; Whitehouse, Mazzucato, Hodder, & Atkinson, 2013). This transition is an extremely important aspect of human history and has been addressed by researchers using other theories, such as cultural evolution (e.g., Henrich, 2016; Norenzayan, 2013; Turchin, 2016) and resource management (e.g., Hayden, 1990, 1995). The IIS's extension to the DMR theory incorporates aspects of both the doctrinal and imagistic mode and

could therefore provide a new explanation for how societies transitioned from one mode of social organization to another when previous accounts have held that they are divergent (see Whitehouse, 2000, 2004a). Future research could instantiate the IIS into a computational model that could then be validated with future psychological and field research (gathered using the methods described in Chapters 3-5) as well as the large longitudinal datasets drawn from historical and archaeological records such as the World Religion Database (2016), Database for Religious History (2015), and SESHAT Databank (2017). This data could be used to test the predictions of a model that used the IIS as an architecture for explaining how different social and biological (i.e. environmental) conditions may have affected social cohesion in different historical contexts. Currently, a large research project at the Center for Mind and Culture has already worked to implement the IIS as an agent-based model to address religious violence (discussed in section 6.2.2), however, future research could utilize agent-based models of the IIS in order to study large-scale religious transitions, such as the Neolithic transition discussed above.

The IIS's extension to the DMR theory makes a clear theoretical space for the ongoing performance of emotionally intense rituals in doctrinal religions. This not only implicates potential transitions from imagistic to doctrinal religions, as described above, but also why emotionally intense rituals may be found in doctrinal religions, which implicates the evolutionary argument put forth by the DMR theory in ways that suggest future directions for research of doctrinal religions. For example, the DMR theory posits that the frequent and low arousal rituals eventually result in tedium, and that some traditions will utilize renewals in order to combat that tedium. The IIS's extension to the DMR theory suggests that the reinvigorations that are recorded in doctrinal traditions (such as those described in Whitehouse, 1995, 2000) will result in fused members of the group. So, even though the emotional intensity of renewal rituals might not afford the quick spread

of low arousal rituals that are frequently attended, they will result in highly committed members. This point presents a research question regarding the relationship between fusion and tedium; namely, if extended fusion is based on conceptual ties, are individuals who are fused to an essential belief of the group (like God; see Chapter 4) as affected by the tedium effect as others? In principle, if an individual has internalized an essential belief of their group's social schema into their personal schema, it may be that tedium does not affect that concept, because it has been linked with an emotionally intense and central aspect of their personal schema. Alternatively, if conceptual ties are also affected by tedium, it could be detrimental to group alignment because individuals could grow bored of the group's essential beliefs. Growing bored of a conceptual tie may cause them to abandon the group as it no longer allows them to facilitate a positive self-image, despite their previous extended fusion to the group, because they are no longer motivated by a belief that represent both the group, and a critical connection linking their personal schema to the social schema. Therefore, one research question of interest for the IIS's extension of the DMR theory should be to what extent are fused beliefs susceptible to the tedium effect and if so, whether this could be a possible path to de-fusion[33] or via viable approach toward deradicalization.

The fact that both frequent low-arousal rituals and rare emotionally intense experiences both foster social cohesion in doctrinal religions appears to fit well with DMR's selection argument. Having multiple ritual arrangements that can serve different purposes. Frequently attending low-arousal rituals would be effective for spreading the beliefs of a group to a large population, thus creating the possibility for many potential cooperation partners as the in-group grows. Meanwhile, rare but emotionally intense experiences could facilitate intense social cohesion and self-sacrifice

[33] De-fusion is currently a hypothetical proposal where a fused individual would no longer be fused to their group (Fredman et al., 2015; Gómez & Vázquez, 2015).

among smaller groups (such as military units) which could serve to defend the group against potential threats from out-groups. As such, the different formations of doctrinal rituals could often be found together due to the different evolutionary pressures that they can help address. This can help explain why doctrinal religious traditions perform multiple types of rituals. For example, Christians will likely perform weekly ceremonies at a church but will also undergo more emotionally intense ritual experiences, such as marriage, confirmation, or an evangelical retreat. The results of the studies presented in Chapters 3-5 suggest that the frequent low arousal rituals can help to codify the group's beliefs and spread the group's schema to recruit more individuals to socially identify with the group while the rare and emotionally intense experiences can serve to bond some of the individuals to the essential beliefs of the group in ways that make them more willing to self-sacrifice for the group.

Recent research has observed that Pentecostal and Charismatic Christianity is growing in areas like Africa and South America (Miller & Yamamori, 2007; Pew Research Center, 2011). In comparison to areas like northern and western Europe, where atheism seems to be more prevalent and traditional religion seems to be in decline (Pew Research Center, 2012, 2015), Africa and South America also appear to have less economic development by some indicators (Welzel, Inglehart, & Klingemann, 2003) and those living in Africa and South America typically have less potable water, higher death rates, and less resource security (The World Bank, 2016). As such, it could be hypothesized that emotionally intense experiences occurring in these religious traditions are facilitating intense social cohesion in order to increase coordination efforts and increase access the necessary resources for survival. Similar rituals would not be required in Northern Europe due to higher levels of economic development and secular political institutions that provide resources

to those in need. Future research can therefore seek to investigate the effects of relative resource scarcity on the possible prevalence of high-arousal rituals in doctrinal religions.

6.2.2. Future directions for devoted actor theory

The IIS's reconciliation between the DMR theory, social identity theory, and fusion theory has also opened up a new direction for future research that may impact on our understanding of religious extremism. The theory of sacred values predicts that, under certain conditions, individuals will be willing to fight and die for a set of beliefs (Atran, Axelrod, & Davis, 2007; Atran & Ginges, 2012). Sacred values are said to represent non-negotiable beliefs that people do not think about rationally. One study has even found that reasoning about sacred values utilizes brain regions associated with semantic rule retrieval and moral evaluations but not with utilitarian reasoning (Berns et al., 2012). It has been noted that the extreme behaviour of individuals who hold sacred values is often similar to the predicted (and observed) behavioural outputs of highly fused individuals; including a greater endorsement of extreme sacrifices for one's in-group and endorsement of extreme behaviours toward outgroups. Recently, researchers focusing on fusion theory and sacred values theory have come together to investigate a new theory that combines the two that is referred to as devoted actor theory (e.g., Atran et al., 2014; Gómez et al., 2017; Sheikh et al., 2016). Devoted actor theory hypothesizes that people will protect sacred values, even being willing to kill or die or those values, when the values are embedded in or fused with a social identity (Sheikh et al., 2014). In previous publications, sacred values have been defined as "a value that incorporates moral and ethical beliefs that can motivate action independently of its prospect of success" (Atran, 2006a, p. 2, also see 2006b).

Given the similarities in behavioural responses between fused individuals and individuals confronted with a threat to a sacred value (i.e., devoted actors), it is possible that these two

phenomena are closely related. One avenue for future research could investigate the extent to which extended fusion and sacred values are both built upon conceptual ties. In principle, conceptual ties make good potential targets for sacred values because they both are related to a socially shared idea that is essential to a group and both can motivate extreme responses, such as endorsing violent attacks against out-groups. For example, the personal histories of many terrorists include autobiographically salient events that informed not only their personal schema, but also the way they aligned with a particular social group (Jensen, Atwell Seate, & James, 2018; Lane, Shults, & Wildman, 2018). *Prima facie*, the relationship between intense autobiographically relevant experiences and extremism appears to align with the IIS's predictions for how conceptual ties are formed. Because of the fact that conceptual ties make connections between the social schema and personal schema that result in one's self being inseparable from a group (since both are defined by the same "essential" information), outside threats to the group's sacred values that have been internalized as conceptual ties would be akin to an attack on the self. As such, it may seem reasonable to a fused individual to endorse or enact extreme actions in light of the threat.

As suggestive as the literature may be for the links above, future research should directly investigate the extent to which those with conceptual ties also show patterns of endorsing self-sacrifice or extreme parochial altruism in the ways that devoted actors appear to. In addition, future fieldwork should aim to replicate the studies presented in Chapters 4 and 5 with large groups of devoted actors in order to 1) check if the results of Chapter 5 can be replicated with a sample that achieves appropriate statistical power and 2) examine if devoted actors are also fused to beliefs that are essential to their group. Currently, I have begun working in collaboration with scholars at Masaryk University to do deploy surveys in conjunction with semi-structured interviews conducted with members of militia groups in Central and Eastern Europe. While this research is

not with a doctrinal religion, the frequency of participation with the militia group's regular trainings appears to be an appropriate variable to be analysed in the model instead of frequency of in-group ritual attendance.

In addition, the relationship between sacred values and the conceptual ties is currently being investigated through computational modelling and simulation techniques. A recent computational model has incorporated the theoretical propositions of the IIS into an agent-based model of the effects of threat perception mechanisms described in the terror management and hazard precaution literature on religion (Shults, Lane, et al., 2017)[34] to produce an agent based model that can allow researchers to study the effects of sacred values and fusion on patterns of mutually escalating religious violence (Shults, Toft, et al., 2017).[35] The model defines sacred values as conceptual ties held by an agent, which are codified by being associated with previous "intense" experiences in the simulation—such as an act of violence. In the model, fused agents can choose to "attack" an out-group member if their anxiety is above a specific threshold. Their anxiety is manipulated by perceptions of hazards in the environment and rises and falls using the associative mechanisms proposed by Joshua Epstein's (2014) Agent_Zero architecture. By investigating data collected by a parameter sweep of the model it was found that the most probable conditions for mutually escalating religious violence were when two nearly equal populations of

[34] This model was developed as part of the Modeling Religion Project at the Center for Mind and Culture. On this project, my role was to aid in model development and the programming of the simulation. I also aided in the validation, verification, analysis of the model, and the writing of the paper cited here. The Modeling Religion Project was funded by the John Templeton Foundation.

[35] This model was developed as part of a joint effort between the Modeling Religion Project at the Center for Mind and Culture and the MODRN project at the Center for Modeling Social Systems. In regard to this project, my role focused on the development of the conceptual model, which drew heavily from the IIS as outlined in Chapter 2 of this dissertation, and its implementation within the AnyLogic simulation software. I also aided in the validation and verification analysis of the model and the writing of the paper cited here. The MODRN Project was funded by the Norwegian Research Council.

different religious groups are found in environments with relatively high social and contagion hazards. These findings appear congruent with other findings in the literature. For example, previous research has found that contagion prevalence in a society is associated with predictors of out-group violence and xenophobia (Cashdan, 2001; Cashdan & Steele, 2013; Fincher & Thornhill, 2012; Schaller & Murray, 2008). In addition, the finding that group sizes are roughly matched in intense sustained conflicts appears to be convergent with a previous model of inter-group violence that models the probability of violence using data from the conflict in the former Yugoslav region (M. Lim, Metzler, & Bar-Yam, 2007).

6.2.3. Future directions for understanding social schisms

A deeper understanding of the complex role of fused individuals in doctrinal religions might help us understand other complex social dynamics, such as schisms. The empirical investigations presented in Chapters 3-5 suggest that fusion is a prominent form of group alignment in doctrinal religions that may result from reflection on central and emotionally intense experiences. However, reflection is proposed to have a negative effect on within-group consensus by introducing new and idiosyncratic beliefs. The results of Chapter 5 suggest that there could be a positive relationship between frequency of in-group ritual attendance increases within-group consensus if future replications find the same results with larger samples. Given their endorsement of extreme self-sacrifice, pro-group behaviours, and out-group punishments, fused individuals appear to be most committed members of the group. However, assuming a negative relationship between fusion and within-group consensus might suggest that fused members of the group drive conceptual and ideological changes in the group. If highly committed members of the group are introducing new beliefs that they codified into their understanding of the group through personal reflection, this could introduce new beliefs into the group over time. The DMR theory proposes

that idiosyncratic beliefs are likely to either be corrected by leadership or fail to transmit to the other members of the group. As such, it is likely to appear like there is continuity between one's personal beliefs and the schema one associates with their religion. However, the IIS's extension of the DMR theory proposes that fusion is the result of conceptual ties. Intuitively, it seems unlikely that an individual will change a belief that they find central to their identity because they are told to—and doing so would violate fusion's irrevocability principle.

This tension between high commitment and new beliefs may help us to explain social schisms in doctrinal religions. Given that the IIS assumes that groups exist within a network structure, the structure of a social group may affect within-group consensus if some individuals are reinforcing idiosyncratic beliefs while others are not. Depending on an individual's place in the social network, they may be able to more efficiently reinforce the social schema or introduce new information into the social schema. This is because of the structure of human social networks, which have been shown to be generally stable over time (Gonçalves, Perra, & Vespignani, 2011; Saramäki et al., 2014) and are well documented to be clustered; i.e., individuals are more likely to have connections that create tightly clustered communities with a few individuals that serve as links between communities rather than networks that are dispersed in a hub-and-spoke fashion (e.g., Ahn, Han, Kwak, Moon, & Jeong, 2007; DiFonzo et al., 2013; Granovetter, 1983; Humphries & Gurney, 2008; Jackson, 2008; Lee & Kim, 2017; McPherson, Smith-Lovin, & Cook, 2001). Clustered network structures could—in principle—result in pockets of information within a group where slightly different types of information come to inform the identities of different clusters. For example, Figure 22 below presents a fictive network of individuals (nodes are black dots) that has been coloured to highlight two clusters in the network (red dashed links and blue dotted links). Given that these individuals could potentially identify within the same social category, they can

utilize a fictive group boundary that unites them in a single group (depicted by the purple circle in broken dashed lines). As such we can say that they are—in principle—aligned to the group by means of social identification. However, if groups of individuals go through some similar experience with one another, they are all likely to reflect on a similar experience, resulting in similar conceptual ties. In addition, if one also maintains that there could be epidemiological effects, this effect could be exacerbated. This is because information could travel more efficiently within a clustered subgroup than it can between clustered subgroups, resulting in the idiosyncratic beliefs from fused members being repeated and codified within a subgroup of members. The clustering of social ties could therefore reinforce the uneven spread of information, and information will have a harder time diffusing *between* the clusters than it will diffusing *within* the clusters (the "social membrane"—if you will—representing the topological weakness between the two social network clusters is represented by the yellow dashed line).

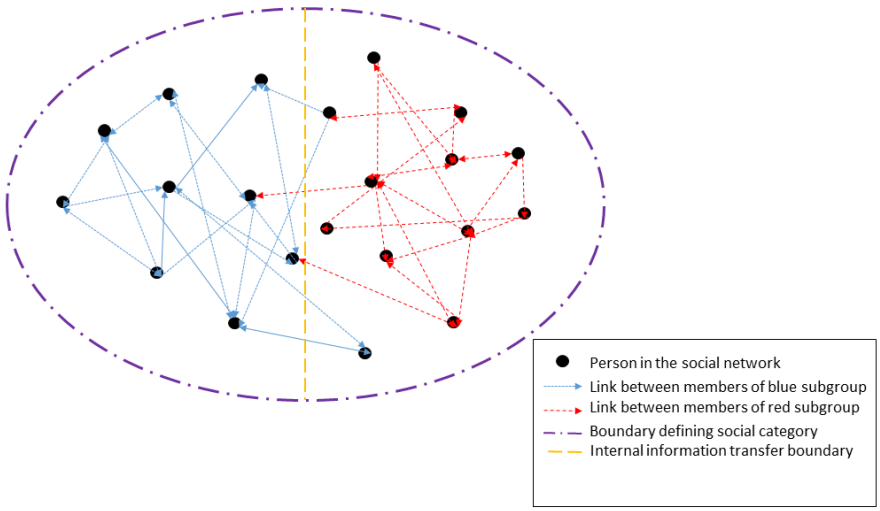


Figure 22. A depiction of potential conditions for schism given the proposals of the IIS. This figure depicts a fictive social group with two clusters (denoted by red dashed and blue dotted links) within a single social category (denoted by the purple circle in broken dashed lines that encircles all nodes and links). Diffusion in this network results in pockets of information that have trouble crossing between clusters (denoted by the yellow dashed line).

From this perspective, the presence of fused individuals in large doctrinal groups that are otherwise reliant upon social identification as the primary mechanism for group alignment may have a significant effect on within-group consensus and group alignment over time; particularly if new information disseminates unevenly throughout the group. This could create an asymmetry within the group where one cluster of the group has a conceptual tie that is not shared by the other cluster within the group. Should instances arise where the conceptual ties are challenged by outside groups or from the other sub-group, it could result in a social schism. For example, if belief X represents a conceptual tie held by individuals in the blue doted link community of Figure 22 that is not held by the red dash link community, an external group pressure that challenges belief X could result in a schism because the members of the red dash link community can disassociate themselves as they would not be fused to the ideas (only aligned by social identification). However, members of the blue doted link community, who hold belief X as a conceptual tie (i.e., it is a sacred value and an essential belief for their group), will be unwilling to disassociate themselves from the group and will consider the challenge against belief X to be a challenge against themselves personally, as belief X defines both their conception of their social group's schema as well as a central part of their own personal schema. Under this circumstance, it could be that members in the blue dotted link community come to view members of the red dashed link community as apostates or free-riders, resulting in a breakdown of social cohesion and the creation of a new group.

In addition, one can imagine a circumstance where members of the red dashed community no longer hold belief X to be a positive aspect of their self-image. As such, members from within that group may distance themselves from belief X. Because this same belief is essential to members of the blue dot community, an internal struggle for the definition of the social category at large

may result in the two sub-communities engaging in a conflict over the group's identity where the blue dot group holds that belief X is essential, while the red dashed group holds that not-belief X is essential. Such a situation may result in social schisms, where highly committed individuals to a rather novel belief break off to form their own group. Examples of this can found in contemporary new religious movements that form from larger pre-existing doctrinal religions (Lane, 2009), such as those discussed in Chapter 5. In addition, this could also be a useful research question to investigate in light of the split between Judaism and Christianity in the 1st century, where it appears that a small subset of highly committed individuals (early Christians) separated from a larger doctrinal religion (Judaism) after an emotionally intense experience (the Great Jewish Revolt).

The approach to social schisms outlined here could also be tested using data drawn from online social networks, such as twitter or Facebook, where data between individuals who are engaging in debates about beliefs essential to a social identity are often recorded in detail along with social network links. For example, debates about the allowance of homosexuality in the Anglican community, or the ordination of women in the Catholic community could be useful potential research targets. Examples of this effect might be found outside of doctrinal religions as well. Debates about controversial topics associated with political identities (such as Brexit in the UK or gun-rights in the US) might also show similar effects. Using the semantic network mapping techniques to analyse the posts on online social networks to measure within-group consensus and the "friends" or "follows" already present in the data of online social networks can present a powerful opportunity to study these effects and presents a target for future longitudinal studies that can test the claims of the IIS.

To conclude, this dissertation allows for a range of future directions that would potentially clarify many theoretical issues, such as the role of fused individuals in introducing new

idiosyncratic beliefs into a group, and potentially be used to address contemporary social and political issues such as schisms, radicalization, and extremism

7. Conclusion

In order to investigate the evolution of doctrinal religions, this dissertation focused on the proximate mechanisms underlying social cohesion in doctrinal religions. By focusing on the proximate mechanisms that underly the evolution of doctrinal religions, the dissertation extended previous work on the DMR theory regarding how, and why, doctrinal religions change over time. By using techniques from anthropology (ethnographic observation and semi-structured interviews), psychology (cross-cultural surveys), and computer science (semantic network mapping and analysis), this research has contributed to our understanding of the role rituals play in facilitating group alignment and maintain within-group consensus in doctrinal religion. As discussed in the previous chapters, the main contributions have been a theoretical synthesis (referred to as the IIS, presented in Chapter 2) that extends the DMR theory to more clearly incorporate the group alignment literature from social psychology that makes new predictions that can account for the persistence of emotionally intense experiences in doctrinal religions such as those found in contemporary Pentecostal and Charismatic Christian traditions. This research supplements this theoretical extension to the DMR theory with three studies. The first two present clear contributions to the empirical literature by demonstrating 1) that frequency of in-group ritual attendance is related to social identification, but that relationship is affected by fusion and 2) that the relationship between the intensity of a religious experience and fusion to both the religious group and a central concept of the group is mediated by perceived frequency of reflection and the perceived centrality of the event. The third study's major contribution is the demonstration of a new method for analysing semi-structured interviews drawn from a naturally occurring group during field-work using semantic network mapping in conjunction with psychometrically

validated survey measures. This technique can be used to analyse any digitized text data and can be a powerful research tool for anthropologists in the future. While the results of the third study are suggestive at best because of its small sample size resulting in an underpowered study, the results of the study suggest clear directions for future research on the effects of group alignment with within-group consensus. These contributions are all discussed in more detail below.

In this research, the DMR theory was presented as a starting point for understanding social cohesion in doctrinal religions. It was noted that, while the DMR theory has many strengths, the theory predicts that emotionally intense rituals in doctrinal religions should die out. However, large scale surveys and demographic projections suggest that approximately 25% of all Christians (the world's largest doctrinal religion) are regularly attending emotionally intense rituals (Pew Research Center, 2011).

Overall, the research found that alignment with doctrinal religions is a complex process that is affected by emotionally intense experiences. It appears that frequent attendance in low arousal rituals can foster social identification with the group performing those rituals and that frequent in-group ritual attendance can create social schemas that define the social categories of the group, to which members align. However, emotionally intense experiences can also affect alignment to a doctrinal religion. This research found evidence that, among those who have gone through an emotionally intense religious or spiritual experience, reflection on the event can result in it becoming a central part of how they see themselves, and this in turn has a positive effect on extended fusion. The IIS suggests that this is because reflection on the event creates conceptual ties, or ties to essential beliefs of our group's social schema that we internalize as central to our own personal identity. This result suggests a slight reframing to those studies that treat essential

beliefs as something that is an antecedent of fusion (e.g., Buhrmester, Newson, et al., 2018; Swann, Buhrmester, et al., 2014) by suggesting that essential beliefs themselves can be *targets* for fusion.

The IIS also posits that within-group consensus is critical to social cohesion. After all, it is difficult to imagine how cohesion can persist among a large group of people unless they all share some understanding of what defines that group. While the study in Chapter 5 was underpowered, its results pointed toward the idea that fusion, which the IIS proposes to be based on reflection, has a weak negative effect on within-group consensus. This effect is predicted by the IIS, but if it is replicated in future research, it could have important repercussions for social cohesion that may be counterintuitive. Namely, those individuals who are the most committed to a group, might not share as many of the same beliefs with other members of the group as those who are highly committed.

Generally, this dissertation fits within an emerging framework in the study of religion that utilizes an interdisciplinary approach to integrate qualitative and quantitative methods. In the past, qualitative and quantitative methods have often been separated; likely because of the distinction drawn between emic and etic aspects of the social sciences. The emic approach (an insider perspective) has relied on tools such as qualitative fieldwork methods to create more holistic approaches to complex topics such as identity, religion, and belief. The etic approach (an outsider perspective) is more open to embracing methods drawn from fields such as psychology and computer science to address similar topics. The methodology employed in the present research leverages an interdisciplinary approach (rooted in cognitive science) to allow for individuals to provide an emic perspective on their own beliefs that can be quantified and integrated in ways that are useful for anthropologists, who—in most circumstances—are outsiders to the subjects that they study. The ability to quantify qualitative data such as that drawn from semi-structured field

interviews helps to create a useful integration between the emic and etic perspectives, all while trying to treat each perspective as an important aspect of the research method. This careful quantification of qualitative information creates a bridge between the emic and etic approaches of anthropology.

In the end, there is still a great deal of research to be conducted in order to better understand social cohesion in doctrinal religions. Contemporary news reports and policy analysis focusing on religious extremists suggests that understanding social cohesion in doctrinal religions will be an important research topic in the coming decades (Toft et al., 2011). Future research may find that the IIS helps to create a better understanding of religious extremism and self-radicalization and, in turn, this research might help to inform policies designed to effectively deal with the potential impact of religious extremism. Future research might also use the IIS in order to better understand critical transitions in human history, such as the schism between 1st century Judaism and Christianity that gave birth to a new religion that has spanned the globe or the Neolithic transition that saw human societies transform from hunter-gatherer groups to civilizations comprising millions of individuals. The research presented in this dissertation has provided a contribution to the literature that can help future research to better understand significant questions regarding how doctrinal religions maintain social cohesion over time. Viewed in this light, this dissertation represents one step, that builds on previous research and makes unique contributions in its own right, in our understanding of social cohesion in doctrinal religions.

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Appendix 2. Survey Questions

This appendix includes the materials used in the surveys presented to participants described in the studies in Chapters 3-5. The first survey, included below in Appendix 2.1, was distributed directly to members of participating churches. All churches received the same questions. The second survey, included below in Appendix 2.2, was distributed online. The version included in Appendix 2.2 is based on the pdf version generated by the Qualtrics software and exported as images for compatibility with Microsoft Word.

Appendix 2.1. Paper survey distributed to congregations

RELIGION IN REAL LIFE

A collaborative project between
the National University, Singapore and
the University of Oxford



Dear participant,

Thank you for participating in this *Religion in Real Life* study. The aim of the *Singapore Religion and Spirituality Project* is to learn about how individuals and their religious communities (e.g., churches, mosques, temples) interact in their local cultural contexts. A key component to the project is surveys like this one, which allow us to hear from individual members of religious groups such as yourself. This survey is created and distributed from a collaboration with NUS and Oxford University, not your church.

This first survey contains questions about **four** topics:

1. *Your immediate cultural or societal context*. People and groups exist in specific cultural or societal contexts. It is important to understand this context when looking at how different kinds of people interact with different kinds of groups. .
2. *Your religious group, and your relationship with it*. We are interested in what your religious community is like, how you feel about it, how it features in your daily life, and vice versa.
3. *Your own religious beliefs and behaviors*. We are interested in you as a religious individual, in how you feel, what you believe, and how you express your beliefs.
4. *Background information about yourself*. This final section of the survey asks questions about yourself—your age and sex, education level, employment status, etc.—in order to ensure that our conclusions can be generalised to other contexts with a similar spread of people.

We expect to gather hundreds of responses from religious groups all over the world. This will enable us to look at how these different traits—cultural, group, individual—relate to one another. Once we have analyzed this information, we will send our results to all participating groups. If you want to hear from us personally, or if you would like to participate in one of our interviews, just let us know by checking the appropriate box at the end of the survey.

Feel free to take your time completing the survey. It usually takes 20-30 minutes to finish. You may do it in multiple sittings if you prefer, though we would like you to complete it in the order provided. If you have any questions or comments, please contact Justin Lane at justin.lane@anthro.ox.ac.uk. Also, if you'd prefer to fill out the survey online, please email Justin for a link. Thanks so much for participating!

Your Cultural Context

Below are a number of statements that can be used to describe social situations in different cultures. Even if they might not apply to you personally, they might apply to people around you. We would like to know how accurately these statements describe *people in your immediate social world* (e.g., friends and acquaintances in your school, colleagues in your workplace, and residents in your town).
Using the scale below, please indicate whether you agree or disagree with each statement, by writing a number beside it.

NB: The term "groups" in some items refers to collections of people who know each other or who share the same goals, such as friendship groups, hobby groups, sports teams, and companies.

Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree	Strongly Agree
0	1	2	3	4	5	6

In my social world:

People have many chances to get to know other people.	
It is common for people to have a conversation with someone they have never met before.	
People are able to choose who they interact with in daily life.	
There are few opportunities for people to form new friendships.	
It is uncommon for people to have a conversation with another person they have never met before.	
If a person does not like their current groups, they would leave for a better one.	
People often cannot freely choose with whom they associate.	
It is easy for people to meet new people.	
Even if a person was not completely satisfied with the group they belonged to, they would usually stay with it anyway.	
People are able to choose the groups and organizations to which they belong.	
Even if they were not satisfied with their current relationships, a person would often have no choice but to stay with them.	
Even though they might rather leave, a person often has no choice but to stay in a group they don't like.	

Your religious community

Within any given religion, different groups or communities share many things in common with one another, but they also differ from one another in many interesting ways. We are interested in whether and how congregational differences within a denomination or religion interact with individuals' traits and particular cultural contexts. In this section of the survey, we would like to know about your main community of worship, that is, the church for which you would say you were a member. We would also like to know about your relationship with that church.

– Please complete as many questions in this section as you can; if there are any questions that you would prefer not to answer, just leave them blank.

What is the name of your church? ……

If applicable, to which denomination does your church belong? ……

How would you describe your church to someone who wanted to know what it was like?

What are your favorite aspects of your church?

What are some ways in which you think your church might improve?

For the following questions, please place an *X* under the option that applies best.

Which of the following terms best describes your church as a whole when it comes to *worship style*?

Very Conservative	Moderately Conservative	Slightly Conservative	Right in the Middle	Slightly Liberal	Moderately Liberal	Very Liberal

Which of the following terms best describes your church as a whole when it comes to *theology*?

Very Conservative	Moderately Conservative	Slightly Conservative	Right in the Middle	Slightly Liberal	Moderately Liberal	Very Liberal

Which of the following terms best describes your church as a whole when it comes to *social* issues?

Very Conservative	Moderately Conservative	Slightly Conservative	Right in the Middle	Slightly Liberal	Moderately Liberal	Very Liberal

The following questions are about the extent to which your church has strong *social norms*—that is, prescribed behaviors—and about how departures from these norms are dealt with. Please indicate your agreement with the following statements, using the scale below:

Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
0	1	2	3	4	5

In my church:

There are many social norms that people are supposed to abide by in this congregation.	
In this congregation, there are very clear expectations for how people should act in most situations.	
People agree upon what behaviors are appropriate versus inappropriate in most situations this congregation.	
People in this congregation have a great deal of freedom in deciding how they want to behave in most situations.	
In this congregation, if someone acts in an inappropriate way, others will strongly disapprove.	
People in this congregation almost always comply with social norms.	

The following questions are about how you see your relationship with your church.
Please indicate your agreement with the following statements, using the scale below:

Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree	Strongly Agree
0	1	2	3	4	5	6

I identify with my church	
I feel committed to my church.	
I am glad to be in my church.	
Being in my church is an important part of how I see myself.	
I am one with my church.	
I feel immersed in my church.	
I have a deep emotional bond with my church.	
My church is me.	
I'll do for my church more than any of the other members would do.	
I am strong because of my church.	
I make my church strong.	
Members of my church are like my family to me.	
If someone in my church is hurt or in danger, it is like a family member is hurt or in danger.	
If someone in my church is hurt or in danger, it is like I am hurt or in danger.	
I see other members of my church as brothers and sisters.	

Your Religious Beliefs and Behaviors

The questions in this section are about your *personal* religious beliefs and behaviors.

Using the scale below, please indicate how often you engage in the following activities:

Never	Less than once a year	About once a year	Several times a year	About once a month	Several times a month	About once a week	Several times a week	Daily
0	1	2	3	4	5	6	7	8

Attend regular worship services at your church (e.g., Sunday service, daily prayer).	
Attend or participate in services and activities held by *other* churches or religious groups.	
Take part in non-worship service activities associated with your church (e.g., discussion groups, outreach, social events).	
Help organize activities for others associated with your church (e.g., worship services, discussion groups, retreats, outreach, social events).	
Engage in personal/private prayer outside of organized worship services.	

The following questions are about the main worship service that you attend at your church.
What is the worship service that you attend most regularly at your church? (e.g., Sunday service, Evening service, Youth service)

.....

What does participating in this worship service mean to you personally?
Please describe what the significance of participating in the worship service is to you.

What do you think is the most important part of that worship service is, and why?

The following questions are about your personal religious beliefs.
Please indicate your agreement with the following statements, using the scale below:

Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree	Strongly Agree
0	1	2	3	4	5	6

There exists an all-powerful, all-knowing, loving God.	
There exists an evil being, whom we might call the Devil.	
There exist good, spiritual beings, whom we might call angels.	
There exist evil, spiritual beings, whom we might call demons.	
Human beings have immaterial, immortal souls.	
There is a spiritual realm besides the physical one.	
Some people will be rewarded in an afterlife when they die.	
Some people will be punished in an afterlife when they die.	
Miracles—divinely-caused events that have no natural explanation—can and do happen.	
There are individuals who are messengers of God and/or can foresee the future.	

Would you say you have had any significant religious experiences? If so, please describe the most significant religious experience you have had, and how it made you feel. (If not, just write, "No", and skip ahead to page 8.)

Please circle the number that applies best, given the endpoints of the scales below.

Thinking about the experience described above:

To what extent do you think that other members of your church have had similar experiences?

Not at all	0	1	2	3	4	5	Very much so

How often do you think about this experience?

I have hardly ever thought again about this experience	0	1	2	3	4	5	I have spent many hours reflecting on it
I have thought about it sporadically	0	1	2	3	4	5	It is always on my mind

How certain are you that you can recall this experience accurately?

Not at all certain	0	1	2	3	4	5	Very certain

How much of a role has this experience played in shaping who you are today?

It has played a small role in making me the person I am today	0	1	2	3	4	5	It has profoundly shaped the person I am today
The person I am now is absolutely unrelated to this experience	0	1	2	3	4	5	I am who I am today because of this experience

Now, we would like you to think about the various challenges or difficulties you may experience in your life (e.g. issues relating to health, emotions, finances, work, family or friends, etc.).

Using the scale below, please indicate how important to you are the following sources of comfort and support during difficult life situation:

Not at all important	Slightly important	Moderately important	Important	Very important
0	1	2	3	4

Your personal religious/spiritual beliefs and convictions.	
Your personal religious/spiritual behaviors and practices.	
The social relationships you have within your church.	
Any services and programs offered to members by your church.	

The following questions are about the importance of various aspects of religious life to you.
Please indicate your agreement with the following statements, using the scale below:

Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree	Strongly Agree
0	1	2	3	4	5	6

Belief in God(s), or a Higher Power, is important to me.	
My religion is an important part of who I am.	
Observance of religious holidays and rituals is important to me.	

Background information about yourself

It is important in social scientific research to record basic census-type information about participants, to help researchers to be cautious in drawing conclusions from their results. Please write down your answers clearly or place an X next to the option that best applies.

Sex:

- ❍ Male
- ❍ Female

Age: …… years

Ethnicity (Please check any which apply):

- ❍ Chinese
- ❍ Malaysian
- ❍ Indian
- ❍ Other

(Please specify: ……)

Marital Status:

- ❍ Single
- ❍ In a committed relationship
- ❍ Married
- ❍ Separated
- ❍ Divorced
- ❍ Widowed

Highest level of formal education completed:

- ❍ None/less than 1 year
- ❍ Preschool or Kindergarten
- ❍ Completed Primary school
- ❍ Completed Secondary School
- ❍ Apprenticeship or trade school training after Secondary School
- ❍ Some College- No Degree
- ❍ Associate's degree (e.g., Higher Cert.)
- ❍ Bachelor's degree (e.g., BA, BSc)
- ❍ Master's degree (e.g., MA, MSc)
- ❍ Professional degree (e.g., MD, JD)
- ❍ Doctorate degree (e.g., PhD., DPhil)

What language(s) do you speak at home?

……

Employment status:

- ❍ Employed full-time
- ❍ Employed part-time
- ❍ Retired
- ❍ Unemployed, actively looking for work
- ❍ Unemployed, not looking for work

If employed, current occupation: ……

Total annual household income (before tax):

- ❍ Less than $20,000
- ❍ $20,000 to $29,999
- ❍ $30,000 to $39,999
- ❍ $40,000 to $44,999
- ❍ $45,000 to $59,999
- ❍ $60,000 to $79,999
- ❍ $80,000 to $99,999
- ❍ $100,000 or more

Number of individuals who rely on income reported above: ……

Would you be interested in participating in a paid (S$10), 30-minute interview within the next few weeks?
If so please provide an email contact here.

_____

Thank you for your time.

Appendix 2.2. Online version of the survey developed with Qualtrics

Intro

Centre for Anthropology and Mind
64 Banbury Road, OX2 6PN, Oxford



Thank you for participating in this study. The aim of the project is to learn about how individuals and their religious communities (e.g., churches) interact in local cultural contexts. A key component to the project is surveys like this one, which allow us to hear from individual members of religious groups such as

In this survey, you will be asked questions about your church, as well as your own religious beliefs and practices. Please complete the survey as fully and h as possible.

Feel free to take your time completing the survey. It usually takes 10 to 15 minutes to finish. If there are any problems or you have any concerns please co Jonathan Jong at jonathan.jong@anthro.ox.ac.uk.

Consent Form

Finally, before beginning the survey, please provide your digital signature by typing your initials at the bottom of the page and tick each of the relevant boxe indicate that you:

- ☐ Have read the information sheet about the study.
- ☐ Have been provided with the opportunity, and the relevant contact details, to contact the study author with any questions and (if applicable) received satisfactory answers to any questions asked.
- ☐ Understand that you may withdraw from the study at any time, without penalty or explanation, and may skip any questions you are uncomfortable answering.
- ☐ Understand that the project has been reviewed, and received ethics clearance through, the University of Oxford Central University Research Ethics Committee.
- ☐ Have been made aware that all identifying personal information provided will remain confidential, will not be used to identify responses, will not appear in any publications and will be deleted after the project is completed.
- ☐ Have been informed of how to raise concerns and/or make complaints.
- ☐ Agree to take part and for your data to be used in the study.

Signed by:

Initials _____

Date (dd/mm/yyyy) _____

Thank you for agreeing to participate in this study.

In this survey, we will be referring to your "church" or "congregation". We understand that some churches have multiple congregations, perhaps meeting at times. Some church buildings are also shared by different denominations. What we mean is your "worshipping community": the group of people you are m in your regular acts of worship and other forms of religious practice (e.g., home groups, Bible studies). This can be either your specific service or could be wider church community. At the end of the survey, we will ask you what you were mainly thinking of when you answered questions about your "church" or "congregation".

Demographic Block

Before we get to the questions about your church, we would like to know a little bit more about you. In any study, it is important to know the make-up of our to ensure that we are looking at a sufficiently diverse group of people.

Please answer the following questions as honestly as possible.

Year of birth:

▼

Where were you born?

City

Country

Ethnicity:

- Chinese
- Indian
- Malay
- Caucasian/White European
- Other European
- Black/African
- Hispanic/Latino
- Pacific Islander
- Other (Please specify)

In what country do you currently live?

- Singapore
- United Kingdom
- Other (please specify)

What is your postal code?

Gender:

- Male
- Female
- Other

What is your marital status?

- Single
- Engaged
- Married
- Divorced
- Re-married
- Widowed
- Civil Partnership

What is the highest level of education you have complete?

- No schooling completed, or less than 1 year
- Nursery, kindergarten, and elementary (grades 1-8)
- Secondary school, High School (no degree)
- Completed High School
- Some college (1-4 years, no degree)
- Associate's degree (including occupational or academic degrees)
- Bachelor's degree (BA, BSc, AB, etc)
- Master's degree (MA, MSc, MENG, MSW, etc)
- Professional school degree (MD, DDC, JD, etc)
- Doctorate degree (PhD, EdD, etc)

What is your current employment status? (Please check any that apply.)

- [ ] Employed full-time
- [ ] Employed part-time
- [ ] Retired
- [ ] Unemployed, actively looking for work
- [ ] Unemployed, not looking for work
- [ ] Other (Please specify)

If you are employed, what is your current occupation?

The following questions are about how you feel about your life in general.

Please answer the questions below:

	Satisfied	Dissatisfied
Are you satisfied or dissatisfied with your standard of living, all the things you can buy and do?	○	○
Are you satisfied or dissatisfied with your personal health?	○	○
Are you satisfied or dissatisfied with your personal safety in your neighbourhood, city, and country?	○	○
Are you satisfied or dissatisfied with your relationships with your family and friends?	○	○

How often do you worry about each of the following?

	Never	Occasionally	Often	Very Often
I worry about financial matters (e.g., paying my rent on time)	○	○	○	○
I worry about my health (e.g., being diagnosed with an illness or catching a virus).	○	○	○	○
I worry about my personal safety (e.g., being mugged or assaulted).	○	○	○	○
I worry about my personal relationships (e.g., marriage)	○	○	○	○
I worry about my social status (e.g., having rumours spread about me).	○	○	○	○

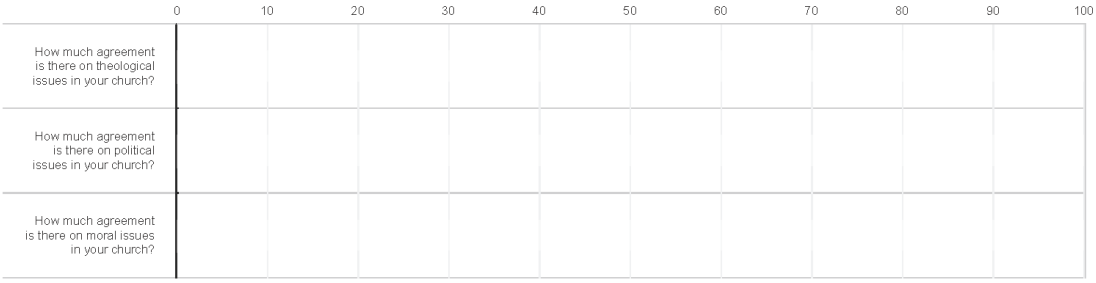
Homophily Questions

In this section of the study, we are interested in (a) how similar members of your church are to each other in various ways, and (b) how similar you are to y church in various ways.

Please answer the following questions as honestly as possible.

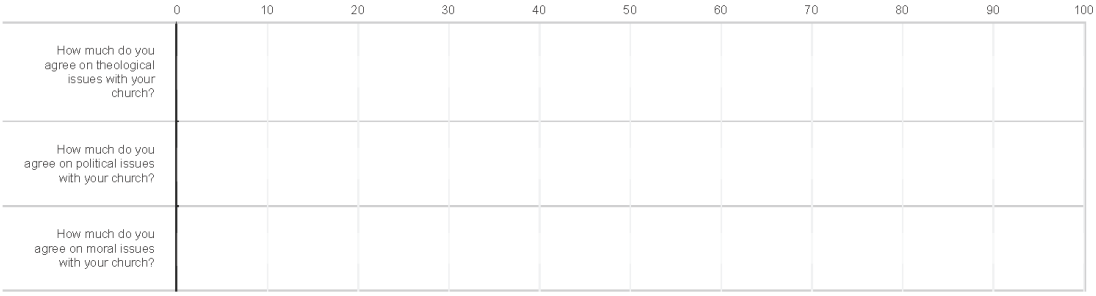
How much does your church or congregation agree on various issues?

Please drag the sliders to indicate how much you feel your congregation agrees on each of the three kinds of issues.
For example, if you believe there is no agreement, leave the slider at 0%. If you believe there is total agreement put the slider at 100%. If you believe the congregation is split 50-50 on the matter, place the slider at 50%



How much do you agree with your church or congregation on these issues?

Again, please drag the sliders to indicate how much you feel you agree with your congregation generally on each of the three kinds of issues.
For example, if you believe there is no agreement, leave the slider at 0%. If you believe there is total agreement put the slider at 100%. If you believe you a your congregation about half the time, place the slider at 50%



We would like to know a little bit more about how similar you are to your church or congregation.

Please answer the following questions to the best of your ability.

	Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Stron
People in my church are about the same age that I am.	○	○	○	○	○	
People in my church are mostly the same ethnicity as me.	○	○	○	○	○	
People in my church make about the same money that I do.	○	○	○	○	○	
People in my church are from the same social status.	○	○	○	○	○	
People in my church believe the same things that I believe.	○	○	○	○	○	
People outside of my congregation respect my church.	○	○	○	○	○	
My churches standing, prestige, and respect are important to me.	○	○	○	○	○	

We also would like to know a little more about your church, and particularly about whether your church has strong *norms*—that is, prescribed or expected v behave—and about how departures from these norms are dealt with.

Please tell us how much you agree with the following statements, using the scale below.

	Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Stron
There are many social norms that people are supposed to abide by in this church.	○	○	○	○	○	
In this church, there are very clear expectations for how people should act in most situations.	○	○	○	○	○	
People agree upon what behaviors are appropriate versus inappropriate in most situations in this church.	○	○	○	○	○	
People in this church have a great deal of freedom in deciding how they want to behave in most situations.	○	○	○	○	○	
In this church, if someone acts in an inappropriate way, others will strongly disprove.	○	○	○	○	○	
People in this church almost always comply with social norms.	○	○	○	○	○	

Identification & Fusion

In this section, we are interested in how you feel about your relationship with and within your church or congregation.

Please answer the following questions as honestly as possible.

Please answer the questions below by selecting how much you agree with the following statements:

	Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Stron
People in my church have a lot in common with each other.	○	○	○	○	○	
People in my church are very similar to each other.	○	○	○	○	○	
I am similar to the average person in my church.	○	○	○	○	○	
I have a lot in common with the average person in my church.	○	○	○	○	○	
I often think about the fact that I am a member of my congregation or church.	○	○	○	○	○	
The fact that I am in my church is an important part of my identity.	○	○	○	○	○	
Being in my church is an important part of how I see myself.	○	○	○	○	○	
	Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Stron

Please answer the questions below by selecting how much you agree with the following statements:

	Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Agree	Somewhat Agree	Str
I identify with my church	○	○	○	○	○	○	
I feel committed to my church	○	○	○	○	○	○	
I am glad to be in my church	○	○	○	○	○	○	
Being part of this church is an important part of how I see myself	○	○	○	○	○	○	

Please answer the questions below by selecting how much you agree with the following statements:

	Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Stro
I am one with my church.	○	○	○	○	○	
I feel immersed in my church.	○	○	○	○	○	
I have a deep emotional bond with my church.	○	○	○	○	○	
My church is me.	○	○	○	○	○	
I'll do for my church more than any of the other members would do.	○	○	○	○	○	
I am strong because of my church.	○	○	○	○	○	
I make my church strong.	○	○	○	○	○	

Church Choice Priorities

We are interested in what you are looking for in a church.

If you were to choose a church to join, what would be important considerations to you in making your choice?

Please order the following from most important at the top, to least important at the bottom.

↑
↓

Size of the congregation
The language spoken at the congregation
The worship style of the church
Similar ethnicity
The congregation was well-known
The number of friends in the congregation
The congregation shared my beliefs
The number of family in the congregation
The pastor/vicar is a strong leader

To what extent are you satisfied with thse aspects of your current church?

	Very dissatisfied	Dissatisfied	Somewhat dissatisfied	Neither Dissatisfied nor Satisfied	Somewhat satisfied	Satisfied	Ver
Size	○	○	○	○	○	○	
Language spoken	○	○	○	○	○	○	
Worship style	○	○	○	○	○	○	
Ethnic makeup	○	○	○	○	○	○	
How well-known	○	○	○	○	○	○	
No. of friends in congregation	○	○	○	○	○	○	
Shared beliefs with congregation	○	○	○	○	○	○	
No. of family members in congregation	○	○	○	○	○	○	

	Very dissatisfied	Dissatisfied	Somewhat dissatisfied	Neither Dissatisfied nor Satisfied	Somewhat satisfied	Satisfied	Ver
Strong leadership	○	○	○	○	○	○	

Personal Religiosity

The following questions are about your personal religious beliefs, practices, and experiences.

Please answer the following questions as honestly as possible.

Please answer the questions below as accurately as possible.

	Never	Less than Once a Month	Once a Month	2-3 Times a Month	Once a Week	2-3 Times a Week
How often do you reflect on your religious beliefs?	○	○	○	○	○	○
How often do you pray for longer than 2 minutes?	○	○	○	○	○	○
How often do you read the Bible?	○	○	○	○	○	○
How often do you discuss your beliefs with people ***within*** your congregation	○	○	○	○	○	○
How often do you discuss your beliefs with people ***outside*** of your congregation	○	○	○	○	○	○

How frequently have you attended a church retreat or a large devotional or religious conference meeting?

Never	Once	Rarely	Every other year or so	Yearly	Two or more tim
○	○	○	○	○	○

Have you ever had a significant or emotional experience that you would describe as a religious or spiritual?

- ○ Yes
- ○ No

Was that experience your conversion or when you where born again?

- ○ Conversion
- ○ Born again
- ○ Other (please specify)

Please tell us more about this experience.

	Strongly Disgree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Stron
My experience was very emotional	○	○	○	○	○	
I often reflect on my experience	○	○	○	○	○	
My experience affects who I am as a person today.	○	○	○	○	○	
	Strongly Disgree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Stron
My experience was a significant event in my life.	○	○	○	○	○	

Think again about the significant religious or spiritual event. Please answer the following questions about the event.

	Totally Disagree	Somewhat Disagree	Neither agree nor disagree	Somewhat Agree	Totally A
I feel that this event has become part of my identity.	○	○	○	○	○
This event has become a reference point for the way I understand myself and the world.	○	○	○	○	○
I feel that this event has become a central part of my life story.	○	○	○	○	○
This event has colored the way I think and feel about other experiences.	○	○	○	○	○
This event permanently changed my life.	○	○	○	○	○
I often think about the effects this event will have on my future.	○	○	○	○	○
This event was a turning point in my life.	○	○	○	○	○
People in my church have had similar emotional experiences to my own.	○	○	○	○	○

How positive or negative was the experience?

Very Negative -4	-3	-2	-1	0	1	2	3	Ver
○	○	○	○	○	○	○	○	

How emotionally intense was the experience?

Not At All 0	1	2	3	4	5	6	7	Extrer
○	○	○	○	○	○	○	○	

We are also interested in your religious beliefs.

Please tell us how much you agree or disagree with these statements.

	Strongly Disagree -4	-3	-2	-1	Neither agree, nor disagree 0	1	2	3
There exists an all-powerful and all-knowing spiritual being, whom we might call God.	○	○	○	○	○	○	○	○
There exist spiritual beings, who might be good or evil, such as angels or demons.	○	○	○	○	○	○	○	○
Every human being has a spirit or soul that is separate from the physical body.	○	○	○	○	○	○	○	○
There is some kind of life after death.	○	○	○	○	○	○	○	○
There is a spiritual realm besides the physical one.	○	○	○	○	○	○	○	○
Supernatural events that have no scientific explanation (e.g. miracles) can and do happen.	○	○	○	○	○	○	○	○

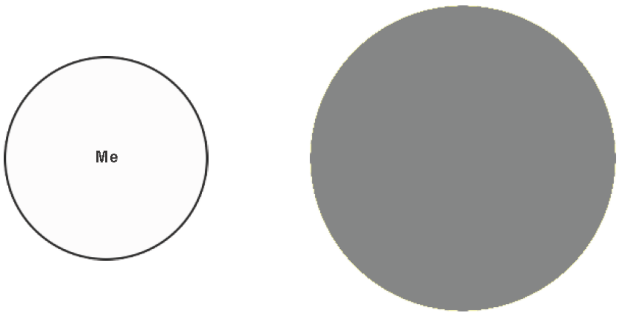
Next, we are interested in how you feel about your relationship with God.
The diagram below is designed to represent your relationship with God.
(NB: It may take some time to load.)

Please indicate your relationship by clicking and dragging the smaller "Me" circle to the position that best captures your relationship with God.

Distance

Overlap

God



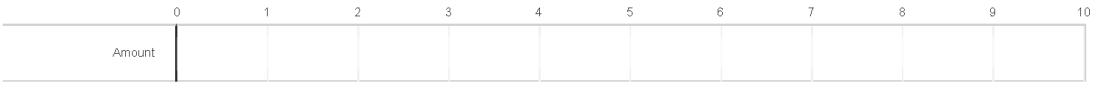
Prosocial Donation

Finally, we want you to imagine being in a scenario, and to tell us what you would do in this scenario.

Assume you are travelling abroad. While you're walking through a new area, you see someone sitting on the sidewalk in front of a café. He is barefoot and in old, dirty clothes, which are a faded blue in colour. He is holding a sign saying "My name is Medhi. Please help", and has a container for donations in fro him.

You have $10 of spending money in your pocket that you could give him.

Please use the slider below to state how much you would give. If you wouldn't donate, leave it at 0.



Why did you give that amount?

Participation Block

What type of Church do you attend?

- Anglican/Church of England
- Armenian
- Assemblies of God
- Baptist
- Bible-Presbyterian
- Brethren
- Church of Jesus Christ of Latter-Day Saints
- Church of Singapore
- Coptic Church
- Episcopalian
- Evangelical Free Church
- Greek Orthodox
- Jehovah's Witness
- Lutheran
- Methodist
- Presbyterian
- Salvation Army
- Syrian
- Roman Catholic
- Russian Orthodox
- Seventh Day Adventist
- Church of Christ
- Unitarian Universalist
- Independent or Non-denominational
- Other (please specify)

What is the name of your church?

Where is your church located? Please include city and state/country
(For example: Oxford, UK or Siglap, Singapore)

How long have you been a member of this congregation?
(numbers only please)

Years

Months

How frequently do you attend this church's services and events (including Bible studies, etc.)?

- Only on special occasions (less than once a year)
- Once a year
- Less than 4 times per year
- 4-8 times per year
- Monthly
- Once a week
- Twice a week
- 3 times a week
- 4 or more times a week

When answering the questions about your "church" or "congregation" in this survey, what kind of group were you thinking of?

- My specific congregation within a church
- My church in general, which has other congregations as part of it
- My denomination in general, which consists of other churches
- The universal Church in general
- Other (Please specify)

Ender

Thank you for participating in this study!

For more questions, please email Dr Jonathan Jong at jonathan.jong@anthro.ox.ac.uk

Appendix 3. Identification Measures

This appendix includes examples of the different social identification scales discussed in this document. Where a group name or description would be given it is replaced with [in-group]. Each measure is presented in a matrix fashion with the statements on the left and the scale following on the right.

Appendix 3.1. Postmes 1-Item or Single-Item Social Identity Measure (SISI; Postmes et al., 2012)

	Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree	Strongly Agree
I identify with my [in-group].							

Appendix 3.2. Postmes 4-Item Measure (Postmes et al., 2005)

	Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree	Strongly Agree
I identify with my [in-group].							
I feel committed to my [in-group]							
I am glad to be in my [in-group]							
Being in my [in-group] is							

an important part of how I see myself							

Appendix 3.3. Leach et al. Scale (1992)

This multi-component scale consists of 14 items. These 14 items fit within 5 components (solidarity, satisfaction, centrality, individual self-stereotyping, and in-group homogeneity). The 5 components fit within two categories (group self-investment and group self-definition). The scale is presented in two tables, each consisting of one of the two categories with each of the components listed in italics along with the statements for the scale.

Group Self Investment							
	Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree	Strongly Agree
Solidarity							
I feel a bond with [in-group]							
I feel solidarity with [in-group]							
I feel committed to [in-group]							
Satisfaction							
I am glad to be [in-group]							
I think that [in-group] have a lot to be proud of.							
It is pleasant to be [in-group]							
Being [in-group] gives							

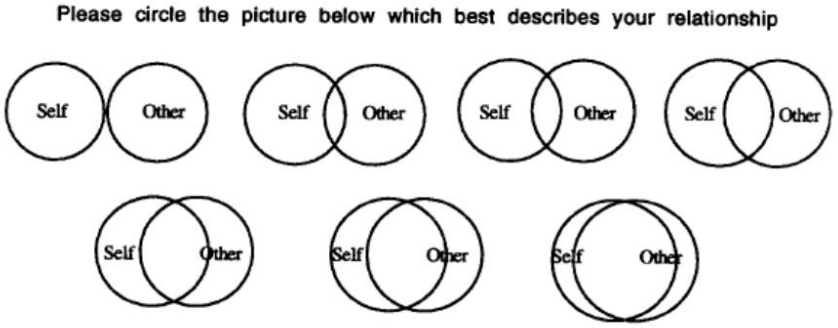
me a good feeling.							
Centrality							
I often think about the fact that I am [in-group]							
The fact that I am [in-group] is an important part of my identity							
Being [in-group] is an important part of how I see myself							

Group Self Definition							
	Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree	Strongly Agree
Individual self-stereotyping							
I have a lot in common with the average [in-group]							
I am similar to the average [in-group] person							
In-group homogeneity							
[in-group] people have a lot in common with each other.							
[in-group] people are very similar to each other.							

Appendix 3.4. Mael & Ashforth Scale (Mael & Ashforth, 1992)

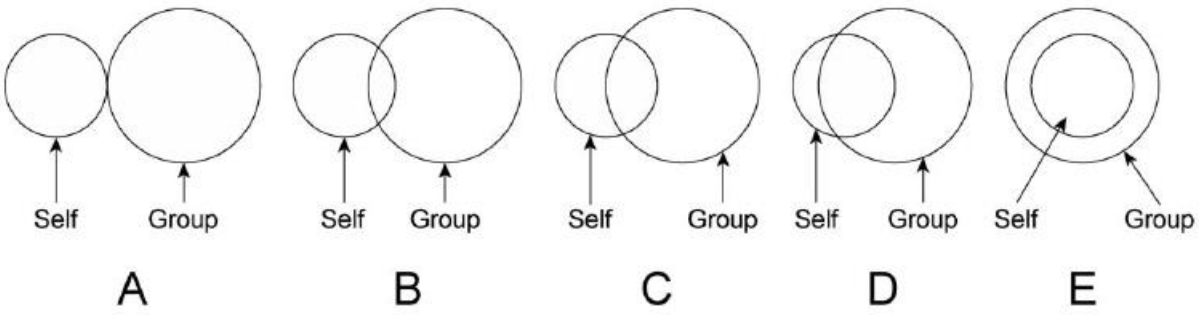
	Strongly Agree	Agree	Neither Agree Nor Disagree	Disagree	Strongly Disagree
When someone criticizes [in-group] it feels like a personal insult					
I am very interesting in what others think about [in-group]					
When I talk about [in-group] I usually say 'we' rather than 'they'					
[In-group] successes are my successes.					
When someone praises [in-group] it feels like a personal complement					
If a story in the media criticized [in-group], I would feel embarrassed.					

Appendix 3.5. Inclusion of Other in Self (Aron et al., 1992)



Appendix 3.6. Fusion (Gómez, Brooks, et al., 2011; also see Jimenez et al., 2015 for a dicussion of fusion measures)

Pictorial



Verbal

	Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree	Strongly Agree
I am one with my [in-group]							
I feel immersed in my [in-group]							
I have a deep emotional bond with my [in-group]							
My [in-group] is me							
I'll do more for my [in-group] than any of the other members would do							
I am strong because of my [in-group]							

I make my [in-group] strong							

Appendix 3.7. Defence of Scales

This research utilized the same scales across all three studies to increase the validity of cross-cultural comparisons. After comparing the available scales, it was determined that the Postmes 4-item scale was best fit for this research. Mael and Ashforth's (1992) scale is directed at measuring those aspects of one's identity that entail a sense of belonging. Although it is a relevant aspect of social identification, this research is most interested in those aspect of social identification that address how one situates themselves as part of a social group and takes as a basic assumption that one feels that they belong to the group. The Mael and Ashforth scale also measures aspects of social identity that may be overlap with fusion. The Aron, Aron, & Smollan inclusion of self in other (ISO) scale was rejected on similar grounds. Visually, there is almost no difference between the ISO scale and the pictorial fusion scale (Gómez, Brooks, et al., 2011). Given this overlap and the unreliability of the pictorial fusion scale found during piloting (Jimenez et al., 2015), the pictorial fusion was excluded from later analyses. Utilizing these scales could introduce confounds when measuring social identity and controlling for fusion. Furthermore, the measure does not offer any strength not provided by the Postmes 4-item scale.

The Leach et al., (2008) multi-component scale focuses on how individuals feel themselves to be part of a homogeneous group and the amount of personal investment they have in their group. Although this measure offers a well validated multi-component approach to social identity, participants may become bored while responding. The scale's length and complexity may be a potential disadvantage in cross-cultural research where English proficiency may be in question. Using a scale with multiple items and multiple components, some of which are not directly relevant

to the hypotheses at hand, poses more risks than a shorter, but equally powerful measure of social identification. Lastly, the Postmes SISI measure, which is a single question, does remedy the time-concerns that are raised by the Leach et al. scale. However, in a cross-cultural population where English is a second or third language, relying on a single question that aims at capturing multiple components of a complex variable such as social identification is risky. The 4-item scale directly captures more aspects of SID and offers a better opportunity to capture a measure of SID that is less prone to inaccuracy in the case that any single item is misunderstood.

Fusion is measured using the verbal fusion scale. The scale is a 6-item, 7-point Likert style scale designed to measure how fused one is with their social group. The full scale can be found in Appendix 4 (as part of a discussion of social identity measures); it is also included in Appendices 2.1 and 2.2 (as part of the full survey descriptions). This was chosen instead of the pictorial fusion scale because it has been shown to be more reliable. There is a third fusion scale, the dynamic identity fusion index that is a computer-based measure written in JavaScript. The dynamic identity fusion index was used in chapter 4 to measure fusion with the concept God.

Appendix 4. Additional Statistical Results

In Chapters 3-5, which present the results of empirical studies testing the key claims of the thesis, there are instances where additional information and analyses may be of interest. These analyses are included in this appendix.

Appendix 4.1. Between Country Differences from Chapter 3

A Games-Howell post-hoc test revealed significant differences in social identification scores where the United States (US) had higher scores than the UK ($p < .01$) and Singapore ($p < .01$), but not New Zealand ($p = .08$) or India ($p = .05$). India had significantly higher scores than the UK ($p < .01$), New Zealand ($p = .01$), and Singapore ($p < .01$). The UK had a significantly lower score than Singapore ($p < .01$) but not New Zealand ($p = .98$). New Zealand was not significantly different from Singapore ($p = .75$).

A second Games-Howell post-hoc test revealed differences in fusion scores. The US had significantly higher fusion scores than the UK ($p < .01$), New Zealand ($p < .01$), and India ($p < .01$), but not Singapore ($p = .41$). India had significantly higher fusion scores than the UK ($p < .01$), Singapore ($p < .01$), UK ($p < .01$), and New Zealand ($p < .01$). The UK had significantly lower fusion than Singapore ($p < .01$) but did not significantly differ from New Zealand ($p = .83$). Singapore had higher fusion scores than New Zealand ($p = .01$).

A third Games-Howell post-hoc test revealed differences in frequency of in-group ritual attendance. The US had significantly higher frequency of in-group ritual attendance than the UK ($p < .01$), and Singapore ($p < .01$), but not India ($p = 1$), or New Zealand ($p = .86$). India had significantly higher frequency of in-group ritual attendance than the UK ($p < .01$) and Singapore ($p < .01$), but no significant differences with New Zealand ($p = .88$). The UK had significantly

lower frequency of in-group ritual attendance than New Zealand ($p < .01$) and Singapore ($p < .01$). New Zealand had higher frequency of in-group ritual attendance than Singapore ($p = .04$).

Appendix 4.2. Mediation Analysis Results Tables from Chapter 4

The analysis of Chapter 4 split the sample into the two different countries for its analysis due to the finding that the dependent and independent variables of the analysis showed significant differences between the populations. In the main text of Chapter 4, models for each country are run independently. The results of the analyses using the pooled sample are included in this appendix.

Appendix 4.2.1. Results of serial mediation analysis using complete pooled sample

Model 1 used the verbal fusion scale as its dependent variable. The analysis did not reveal a significant direct effect (B = -.05; SE = 0.03; t = -1.87; *95% CI* = [-0.11, 0.002]). Significant indirect effects were found for indirect effect 1, which was the mediating role of perceived frequency of reflection on the relationship between emotional intensity and fusion (B = 0.04; SE = 0.02; β = .04; *95% CI* = [0.01, 0.07]), indirect effect 2, which was the mediating effect of both perceived frequency of reflection and then perceived centrality of event on the relationship between emotional intensity and fusion (B = 0.04; SE = 0.01; β = .04; *95% CI* = [0.03, 0.06]), and indirect effect 3, which was the mediating role that the perceived centrality of event had on the relationship between intensity and fusion (B = 0.06; SE = 0.01; β = .06; *95% CI* = [0.03, 0.08]).

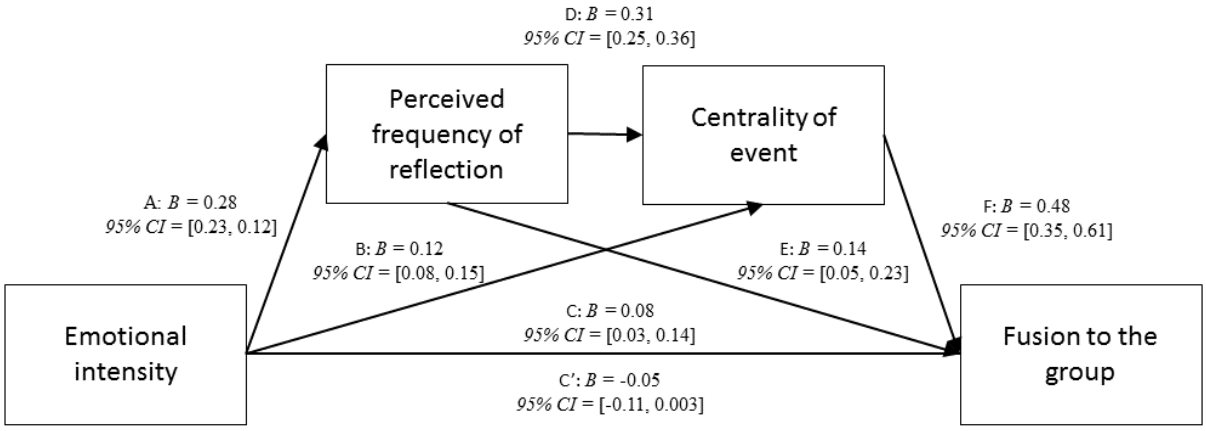


Figure 23. This is a visual depiction of serial mediation model 1 using the data from both samples together and frequency of retreat attendance as a control. The coefficients and 95% confidence intervals for the individual relationships of the model are included for each relationship. A: regression of perceived frequency of reflection (DV) and emotional intensity (IV). B: regression of perceived centrality of event (DV) and emotional intensity (IV). C: the total effect of emotional intensity (X) on fusion to the group (Y). D: regression of perceived centrality of event (DV) and perceived frequency of reflection (IV). E: regression of fusion to the group (DV) and perceived frequency of reflection (IV). F: regression of fusion to the group (DV) and perceived centrality of event (IV). C' represents the direct effect of emotional intensity (X) on fusion to the group (Y). All indirect effects are reported in the preceding paragraph.

Model 2 was identical to Model 1 in all aspects except that it used the participants' overlap with God score (as measured with the dynamic identity fusion index) as its dependent variable instead of fusion with the group as measured by the verbal fusion score. The analysis of Model 2 did not find a significant direct effect (B = -1.07; SE = 1.40; t = -0.76; *95% CI* = [-3.83, 1.68]). The analysis of Model 2 revealed that indirect effect 1, which was the mediating role of perceived frequency of reflection on the relationship between emotional intensity and fusion, was not significant (B = 0.82; SE = 0.68; β = .02; *95% CI* = [-0.01, 0.05]). The model did find significant effects for indirect effect 2, which was the mediating effect of both perceived frequency of reflection and then perceived centrality of event on the relationship between emotional intensity and fusion (B = 1.69; SE = 0.40; β = .03; *95% CI* = [0.02, 0.05]) and indirect effect 3, which was the mediating role that the perceived centrality of event had on the relationship between intensity and fusion (B = 2.32; SE = 0.50; β = .05; *95% CI* = [0.03, 0.07]).

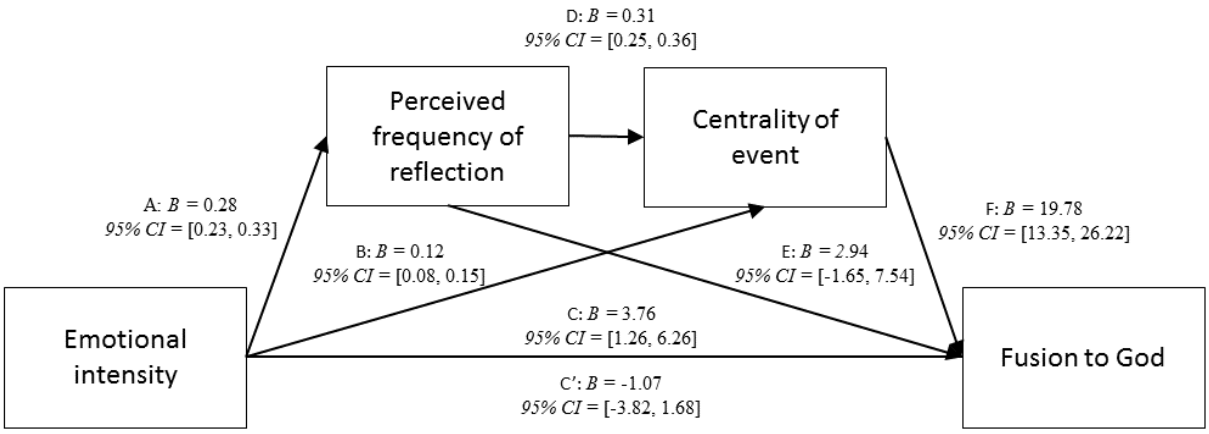


Figure 24. This is a visual depiction of serial mediation model 2 using the data from both samples together and frequency of retreat attendance as a control. The coefficients and 95% confidence intervals for the individual relationships of the model are included for each relationship. A: regression of perceived frequency of reflection (DV) and emotional intensity (IV). B: regression of perceived centrality of event (DV) and emotional intensity (IV). C: the total effect of emotional intensity (IV) on fusion to God (DV). D: regression of perceived centrality of event (DV) and perceived frequency of reflection (IV). E: regression of fusion to God (DV) and perceived frequency of reflection (IV). F: regression of fusion to God (DV) and perceived centrality of event (IV). C' represents the direct effect of emotional intensity (X) on fusion to God (Y). All indirect effects are reported in the preceding paragraph.

Table 10

Effect of frequency of retreat attendance for direct and indirect effects in Models 1 and 2 reported in Chapter 4. Retreat attendance was treated as a control in these models.

Model	Sample	IV	DV	*B*	*SE*	*t*	*95% CI*
1	Singapore	X	M1	0.06	0.04	1.63	-0.01, 0.14
		X, M1	M2	0.10	0.02	4.47	0.06, 0.15
		X, M1, M2	Y	0.15	0.04	3.91	0.07, 0.22
		X	Y	0.22	0.04	5.51	0.14, 0.29
1	UK	X	M1	0.08	0.03	2.34	0.01, 0.15
		X, M1	M2	0.10	0.02	4.01	0.05, 0.14
		X, M1, M2	Y	0.22	0.03	6.24	0.15, 0.28
		X	Y	0.28	0.04	7.81	0.21, 0.35
1	Total	X	M1	0.07	0.03	2.85	0.02, 0.12
		X, M1	M2	0.10	0.02	6.34	0.07, 0.14
		X, M1, M2	Y	0.19	0.03	7.84	0.14, 0.24
		X	Y	0.26	0.03	9.86	0.21, 0.31
2	Singapore	X	M1	0.06	0.04	1.63	-0.01, 0.14
		X, M1	M2	0.10	0.02	4.47	0.06, 0.15
		X, M1, M2	Y	4.45	1.95	2.29	0.62, 8.29
		X	Y	7.31	1.96	3.73	3.54, 11.17

Model	Sample	IV	DV	*B*	*SE*	*t*	*95% CI*
2	UK	X	M1	0.08	0.03	2.34	0.01, 0.15
		X, M1	M2	0.10	0.02	4.01	0.05, 0.14
		X, M1, M2	Y	3.38	1.68	2.02	0.08, 6.69
		X	Y	5.90	1.69	3.49	2.57, 9.23
2	Total	X	M1	0.07	0.03	2.85	0.02, 0.12
		X, M1	M2	0.10	0.02	6.34	0.07, 0.14
		X, M1, M2	Y	3.73	1.27	2.94	1.24, 6.23
		X	Y	6.44	1.28	5.05	3.94, 8.95

Appendix 4.2.2. Results of serial mediation analysis using complete pooled sample without frequency of retreat attendance added as a control

Differences were found between the two groups' results for Model 1, which tested that perceived frequency of reflection (M1) and perceived centrality of event (M2) mediate the relationship between emotional intensity and fusion to one's social group. Specifically, in Singapore, significant effects were not found for the direct effect (*B* = -0.04; *SE* = 0.40; *t* = -1.04; *95% CI* = [-0.12, 0.04]) or indirect effect 1 (*B* = .03; *SE* = 0.02; *ß* = .03; *95% CI* = [-0.01, 0.07]). Significant effects were found for indirect effect 2 (*B* = 0.05; *SE* = 0.01; *ß* = 0.05; *95% CI* = [0.33, 0.08]) and indirect effect 3 (*B* = 0.08; *SE* = 0.02; *ß* = 0.07; *95% CI* = [0.04, 0.12]).

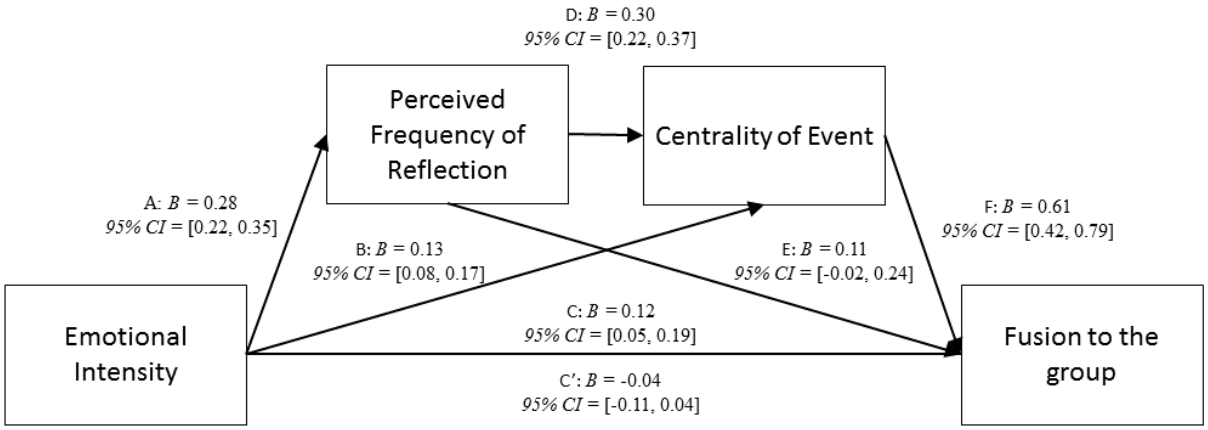


Figure 25. This is a visual depiction of serial mediation model 1 using the data from the Singaporean sample and frequency of retreat attendance is not included as a control. The coefficients and 95% confidence intervals for the individual relationships of the model are included. A: regression of perceived frequency of reflection (DV) and emotional intensity (IV). B: regression of perceived centrality of event

(DV) and emotional intensity (IV). C: the total effect of emotional intensity (IV) on fusion to the group (DV). D: regression of perceived centrality of event (DV) and perceived frequency of reflection (IV). E: regression of fusion to the group (DV) and perceived frequency of reflection (IV). F: regression of fusion to the group (DV) and perceived centrality of event (IV). C' represents the direct effect of emotional intensity (X) on fusion to the group (Y). All indirect effects are reported in the preceding paragraph.

In the sample from the UK, no direct significant effect was found (B = -0.08; SE = 0.05; t = -1.66; *95% CI* = [-0.17, 0.02]). However, significant indirect effects were found indirect effect 1 (B = 0.05; SE = 0.03; β = 0.04; *95% CI* = [0.001, 0.14]), indirect effect 2 (B = 0.06; SE = 0.02; β = 0.05; *95% CI* = [0.03, 0.09]), and indirect effect 3 (B = 0.08; SE = 0.02; β = 0.06; *95% CI* = [0.03, 0.11]).

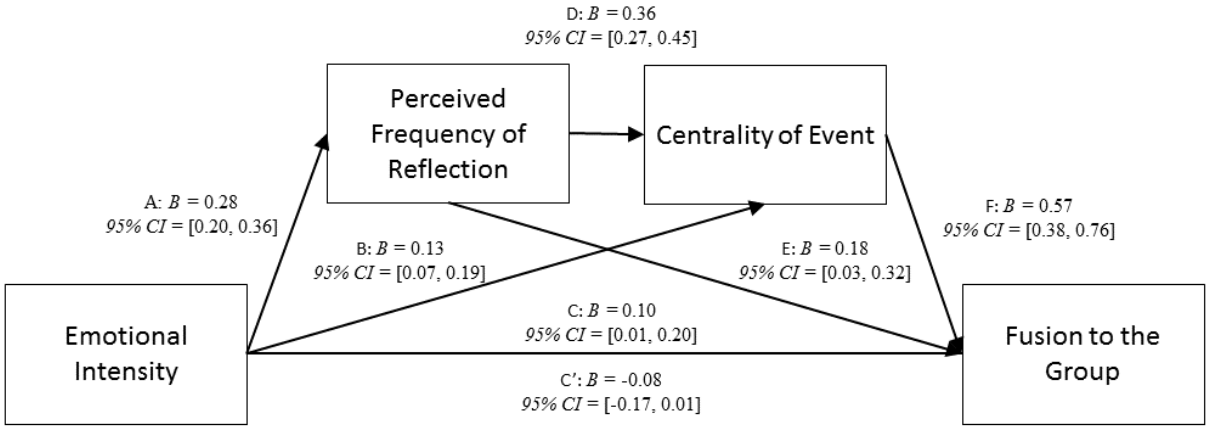


Figure 26. This is a visual depiction of serial mediation model 1 using the data from the UK sample, the coefficients and 95% confidence intervals. A: regression of perceived frequency of reflection (DV) and emotional intensity (IV). B: regression of perceived centrality of event (DV) and emotional intensity (IV). C: total effect of emotional intensity (IV) on fusion to the group (DV). D: regression of perceived centrality of event (DV) and perceived frequency of reflection (IV). E: regression of fusion to the group (DV) and perceived frequency of reflection (IV). F: regression of fusion to the group (DV) and perceived centrality of event (IV). C' represents the direct effect of emotional intensity (X) on fusion to the group (Y). All indirect effects are reported in the preceding paragraph.

No qualitative differences were found between the two samples regarding the results of Model 2. In Singapore, significant effects were not found for the direct effect (B = -2.22; SE = 1.48; t = -1.50; *95% CI* = [-5.14, 0.69]) or indirect effect 1 (B = 0.10; SE = 0.65; β = 0.003; *95% CI* = [-0.03, 0.04]). Significant indirect effects were found for indirect effect 2 (B = 1.75; SE = 0.41; β = 0.05; *95% CI* = [0.03, 0.07]) and indirect effect 3 (B = 2.59; SE = 0.69; β = 0.07; *95% CI* = [0.04, 0.11]).

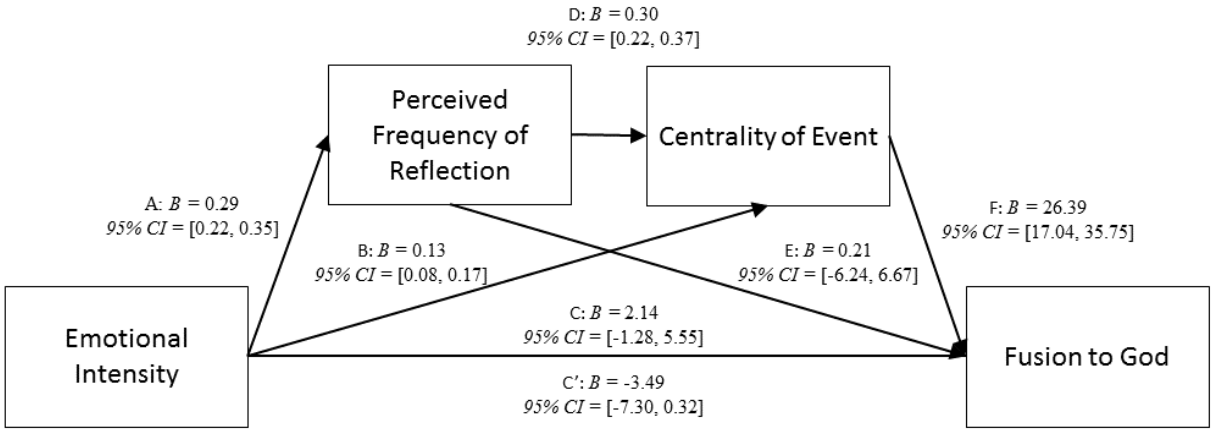


Figure 27. This is a visual depiction of serial mediation model 2 using the data from the Singaporean sample, the coefficients, and 95% confidence intervals. A: regression of perceived frequency of reflection (DV) and emotional intensity (IV). B: regression of perceived centrality of event (DV) and emotional intensity (IV). C: total effect of emotional intensity (IV) on fusion to God (DV). D: regression of perceived centrality of event (DV) and perceived frequency of reflection (IV). E: regression of fusion to God (DV) and perceived frequency of reflection (IV). F: regression of fusion to God (DV) and perceived centrality of event (IV). C' represents the direct effect of emotional intensity (X) on fusion to God (Y). All indirect effects are reported in the preceding paragraph.

In the sample from the UK, significant effects were not found for the direct effect (*B* = 1.38; *SE* = 1.70; *t* = 0.81; *95% CI* = [-1.96, 4.72]) or indirect effect 1 (*B* = 0.93; *SE* = 0.85; *ß* = 0.02; *95% CI* = [-0.02, 0.07]). Significant indirect effects were found for indirect effect 2 (*B* = 1.40; *SE* = 0.53; *ß* = 0.04; *95% CI* = [0.01, 0.07]) and indirect effect 3 (*B* = 1.77; *SE* = 0.60; *ß* = 0.04; *95% CI* = [0.02, 0.08]).

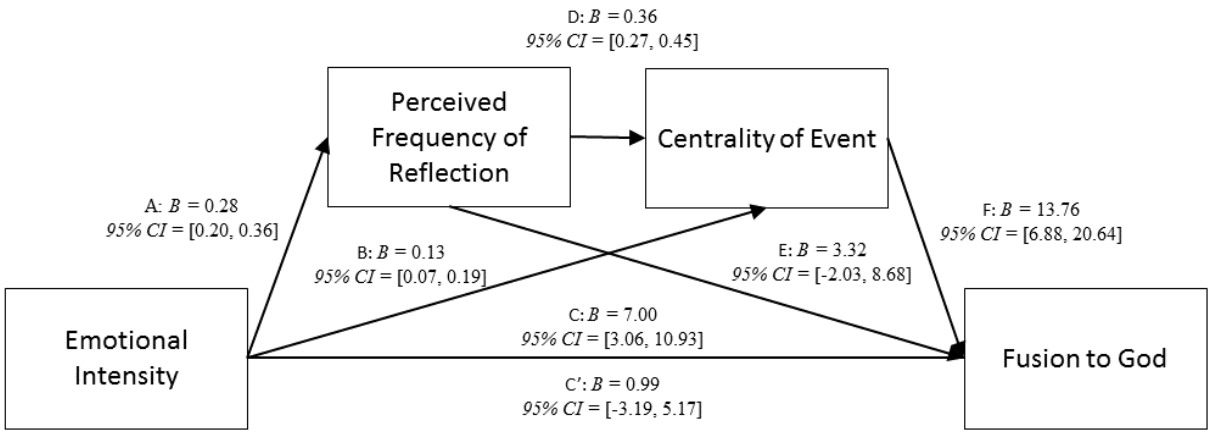


Figure 28. This is a visual depiction of serial mediation model 2 using the data from the UK, the coefficients, and 95% confidence intervals. A: regression of perceived frequency of reflection (DV) and emotional intensity (IV). B: regression of perceived centrality of event (DV) and emotional intensity (IV). C: total effect of emotional intensity (X) on fusion to God (Y). D: regression of perceived centrality of event (DV) and perceived frequency of reflection (IV). E: regression of fusion to God (DV) and perceived frequency of reflection (IV). F: regression of fusion to God (DV) and perceived centrality of event (IV). C' represents the direct effect of emotional intensity (X) on fusion to God (Y). All indirect effects are reported in the preceding paragraph.

Pooling the samples from the UK and Singapore into a single dataset yielded results that were different than the individual country results. However, it is possible that these effects were driven by the significant between group's differences discussed in the main text (Section 4.3). The results of running the models using the pooled data samples are reported below.

Model 1 used the verbal fusion scale as its dependent variable. The analysis revealed a significant direct effect (B = -.07; SE = 0.03; t = -2.27; *95% CI* = [-0.12, -0.01]). In addition, significant indirect effects were found for indirect effect 1, which was the mediating role of perceived frequency of reflection on the relationship between emotional intensity and fusion (B = 0.04; SE = 0.02; β = .04; *95% CI* = [0.01, 0.06]), indirect effect 2, which was the mediating effect of both perceived frequency of reflection and then perceived centrality of event on the relationship between emotional intensity and fusion (B = 0.06; SE = 0.01; β = .05; *95% CI* = [0.04, 0.07]), and indirect effect 3, which was the mediating role that the perceived centrality of event had on the relationship between intensity and fusion (B = 0.07; SE = 0.02; β = .07; *95% CI* = [0.04, 0.10]).

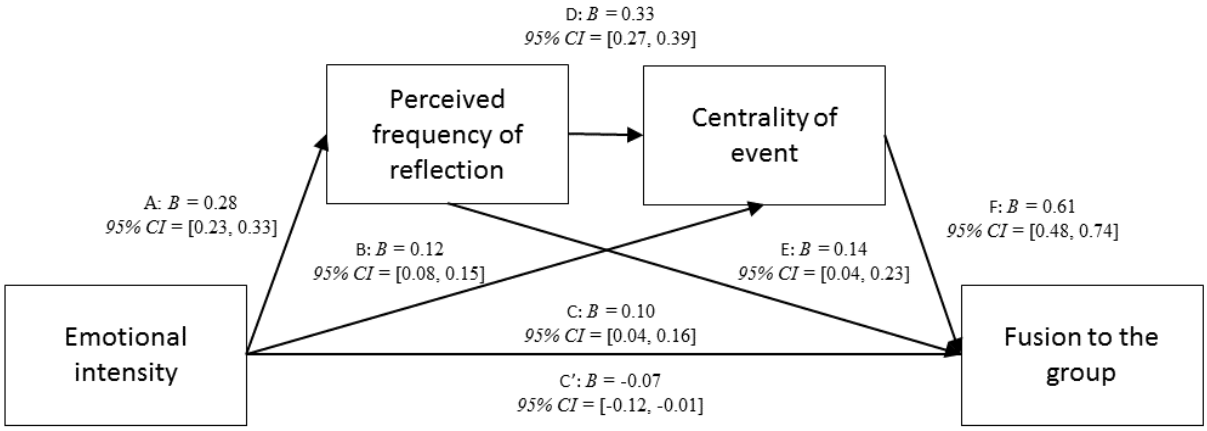


Figure 29. This is a visual depiction of serial mediation model 1, using the data from both samples together, the coefficients, and 95% confidence intervals. A: regression of perceived frequency of reflection (DV) and emotional intensity (IV). B: regression of perceived centrality of event (DV) and emotional intensity (IV). C: total effect of emotional intensity (X) on fusion to the group (Y). D: regression of perceived centrality of event (DV) and perceived frequency of reflection (IV). E: regression of fusion to the group (DV) and perceived frequency of reflection (IV). F: regression of fusion to the group (DV) and perceived centrality of event (IV). C' represents the direct effect of emotional intensity (X) on fusion to the group (Y). All indirect effects are reported in the preceding paragraph.

Model 2 was identical to Model 1 in all aspects except that it used the participants' overlap with God score (as measured with the dynamic identity fusion index) as its dependent variable instead of fusion with the group as measured by the verbal fusion score. The analysis of Model 2 did not find a significant direct effect (B = -0.50; SE = 1.10; t = -0.46; *95% CI* = [-2.66, 1.66]). The analysis of Model 2 revealed that indirect effect 1, which was the mediating role of perceived frequency of reflection on the relationship between emotional intensity and fusion, was not significant (B = 0.52; SE = 0.52; β = .02; *95% CI* = [-0.02, 0.07]). The model did find significant effects for indirect effect 2, which was the mediating effect of both perceived frequency of reflection and then perceived centrality of event on the relationship between emotional intensity and fusion (B = 1.57; SE = 0.33; β = .04; *95% CI* = [0.03, 0.06]) and indirect effect 3, which was the mediating role that the perceived centrality of event had on the relationship between intensity and fusion (B = 1.98; SE = 0.41; β = .09; *95% CI* = [0.06, 0.12]).

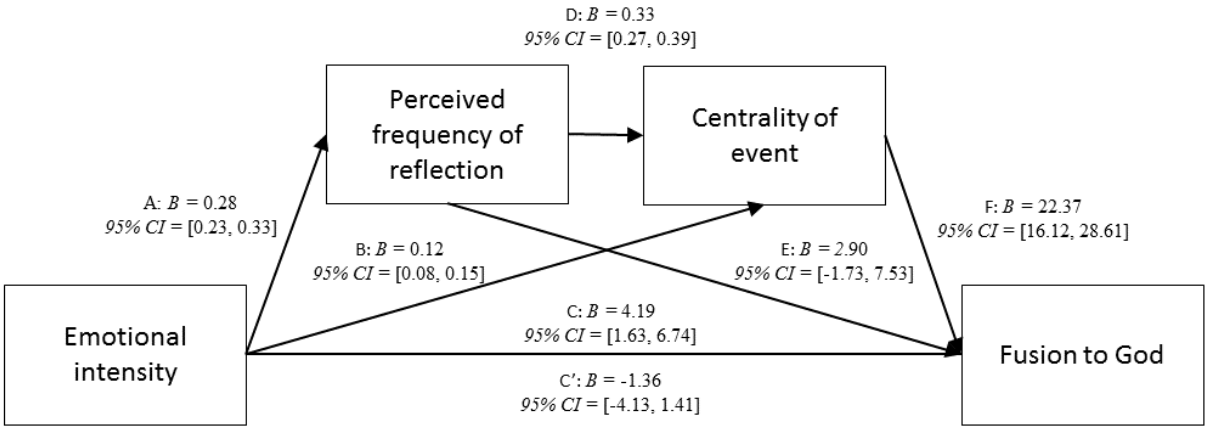


Figure 30. This is a visual depiction of serial mediation model 2 using the data from both samples together, the coefficients, and 95% confidence intervals. A: regression of perceived frequency of reflection (DV) and emotional intensity (IV). B: regression of perceived centrality of event (DV) and emotional intensity (IV). C: total effect of emotional intensity (X) on fusion to God (Y). D: regression of perceived centrality of event (DV) and perceived frequency of reflection (IV). E: regression of fusion to God (DV) and perceived frequency of reflection (IV). F: regression of fusion God (DV) and perceived centrality of event (IV). C' represents the direct effect of emotional intensity (X) on fusion to God (Y). All indirect effects are reported in the preceding paragraph.

Appendix 4.2.3. Partial replication of Jong et al., (2016)

In attempting to replicate some of the findings of Jong et al, (2016) mediation models were run to investigate whether the relationship between emotional intensity and fusion is mediated by reflection. The analysis of the total combined sample revealed no significant direct effect of emotional intensity on fusion with the group ($B = 0.01$; $SE = 0.03$; $t = 0.18$; *95% CI* = [-0.05, 0.07]) or fusion with God ($B = 1.48$; $SE = 1.10$; $t = 1.34$; *95% CI* = [-0.69, 3.65]). It was found that perceived frequency of reflection mediates the relationship between emotional intensity and fusion to the group and emotional intensity and fusion to God (results are depicted in Figures 31 and 32 respectively).

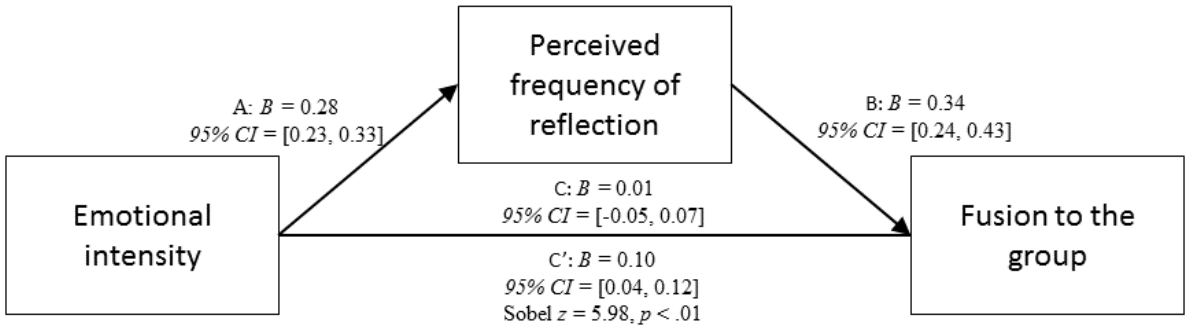


Figure 31. Mediation model testing the hypothesis that the relationship between emotional intensity and fusion to the group is mediated by perceived frequency of reflection using all participants.

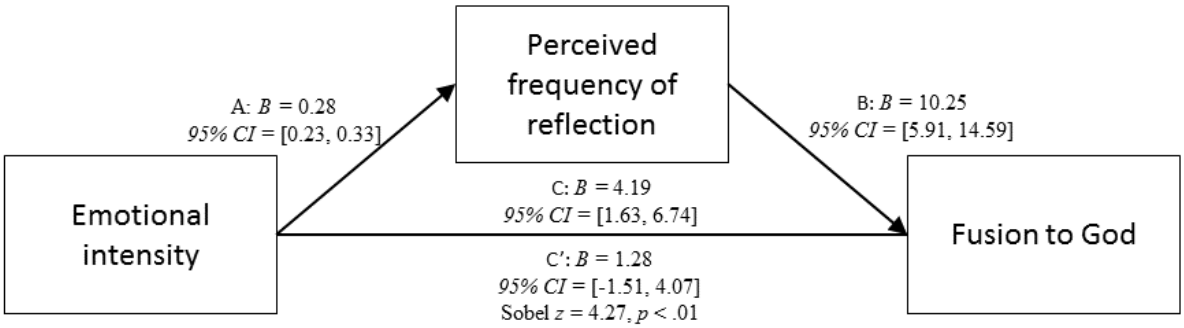


Figure 32. Mediation model testing the hypothesis that the relationship between emotional intensity and fusion to God is mediated by perceived frequency of reflection using all participants.

Appendix 4.2.4. Partial Replication of Buhrmester, Burnham et al., (2018)

The data collected for the study in Chapter 4 provides an opportunity to also replicate the results of a study published after the studies for this dissertation were complete. Nevertheless, the opportunity to replicate these results presents itself. As such, mediation models were run in order to partially replicate the results of Buhrmester, Burnham et al. The results of the models using the UK and Singaporean samples can be found in the text. These models were run using the split sample due to significant differences in emotional intensity and fusion as discussed in Section 4.3. The results of the total model are reported below.

This model tested whether the relationship between emotional intensity and fusion to the group is significantly mediated by fusion to God using both the UK and Singaporean samples

combined. This model revealed a significant direct effect (*B* = 0.06; *SE* = 0.03; *t* = 2.28; *95% CI* [0.01, 0.11]) and indirect effect (*B* = 0.04; *SE* = 0.01; *95% CI* [0.02, 0.07]).

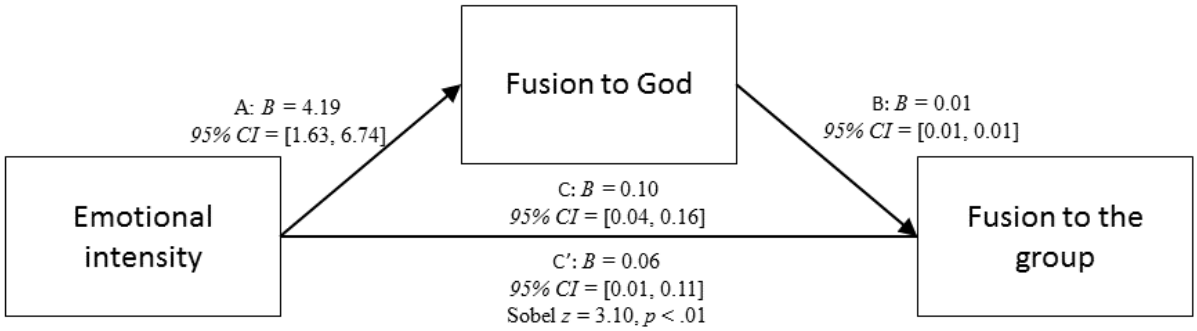


Figure 33. Mediation model testing the hypotheses, inspired by Buhrmester, Burnham et al., that the relationship between emotional intensity and fusion to a group is mediated by fusion to a concept that is important to the group. This mediation model used data pooled from both the UK and Singaporean samples.

Appendix 4.3. Uniqueness of Schemas

The results of the semi structured interview analysis in Chapter 5 reveal that individuals come to learn how to extend beliefs to address a wide range of subjects. However, even though the participants were all Protestant Christians from Singapore, the schemas that are recorded from each group are different from one another. This is demonstrated by looking at the two group's networks at the level of concepts. The ten concepts with the highest total degree provided by the participants from each group are listed in Table 11. Table 11 includes a sample of the top 10 concepts discussed by the participants in the semi-structured interview, ranked by their total degree for the group union network. Term frequency is included for qualitative comparison.

Table 11

High total degree concepts for each of the two groups.

Concept Group 1	Total degree Group 1	Term Frequency Group 1	Concept Group 2	Total degree Group 2	Term Frequency Group 1
church	.0263	121	God	.0502	92
real	.0242	136	church	.0456	78
worship	.0215	107	people	.0370	60
God	.0203	95	worship	.0366	71
people	.0196	83	sermon	.0364	66
pastor	.0193	85	pray	.0348	84
jesus_christ	.0179	86	service	.0342	60
say	.0167	80	real	.0313	49
doing	.0151	64	give	.0262	45
give	.0149	68	read	.0262	40

This shows that although there are clear structural similarities between the networks defining the schemas of the two groups (such as both appearing to have scale free distributions of total degree), the concepts that occupy the most prominent positions in the network are unique to each group.

A similar pattern is observed if we rank the concepts in each group by conceptual similarity.[37] Those concepts which seem to have the greatest total degree also have the greatest rating of conceptual similarity. The ten concepts with the greatest conceptual similarity in groups 1 and 2 are displayed in Table 12 and 13, respectively (numbers are given an extra digit as the differences are more easily interpretable with 3 decimal places).

[37] This is calculated using ORA's node-level measure of consensus, which is a weighted count of the number of similar links a node in one network shares with a node of the same name in another network.

Table 12

Top 10 concepts with greatest conceptual similarity from members in Group 1.

Concept	Conceptual similarity	Total degree	Betweenness
church	.065	.020	.026
real	.057	.022	.024
people	.047	.014	.020
God	.039	.016	.020
worship	.034	.018	.021
guess	.032	.011	.013
say	.031	.013	.017
donot	.028	.009	.012
give	.028	.011	.015
jesus_christ	.028	.014	.018

Table 13

Top 10 concepts with greatest conceptual similarity from members in Group 2.

Concept	Conceptual similarity	Total degree	Betweenness
God	0.073	0.023	0.05
church	0.069	0.02	0.046
people	0.055	0.015	0.037
service	0.052	0.015	0.034
worship	0.041	0.018	0.037
pray	0.037	0.021	0.035
real	0.037	0.012	0.031
sermon	0.035	0.017	0.036
give	0.033	0.011	0.026
guess	0.031	0.01	0.022

Generally, concepts with high total degree also have greater term frequency (i.e., they appear more often) in networks drawn from religious materials (Lane, 2015b).[38] This pattern also holds in the case of the networks resulting from the semi-structured interviews.[39] The top ten most frequent concepts are included in Figures 34 and 35 below. It is useful to note that almost all of these concepts are included in the table of high total degree and high conceptual similarity provided above.

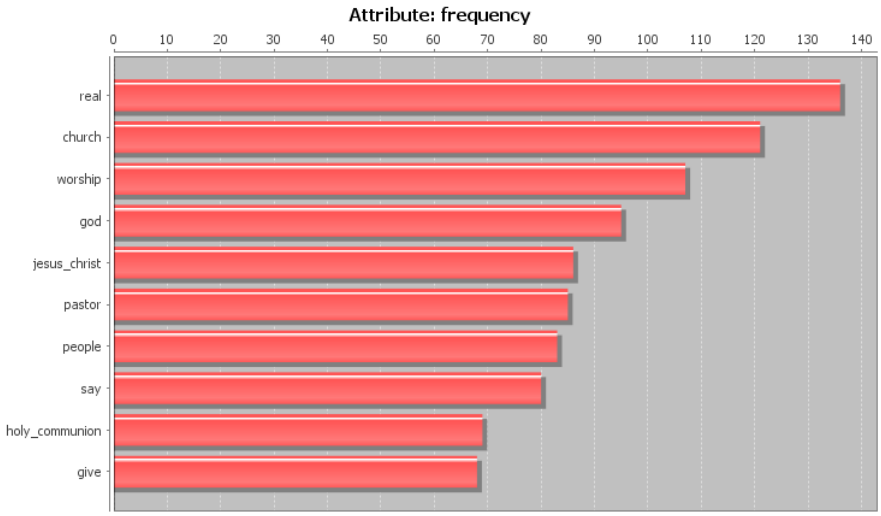


Figure 34. *Concepts by term frequency, Group 1.*

[38] Some may initially believe this to be a statistical artefact. However, this is not the case. As discussed in Lane 2015b, it is possible for highly frequent terms to have a centrality that is not affected by its term frequency. For example, take the "Lord's Prayer" or "Pater nostra": it is frequently repeated by Christian communities. However, because its structure is identical at every presentation, any increase in the frequency of its recitation above the initial recitation will not affect the centrality of the nodes as no new conceptual links are presented with subsequent repetitions.

[39] In group 1, conceptual similarity correlates with centrality (r_s = .864, p < .001, *95% CI*: [0.832, 0.893]) and term frequency (r_s = .283, p < .001, *95% CI*: [.227, .339]), centrality correlates with term frequency (r_s = .303, p < .001, *95% CI*: [0.244, 0.359]). In group 2, conceptual similarity correlates with centrality (r_s = .740, p < .001, *95% CI*: [.707, .771]) and term frequency (r_s = .255, p < .001, *95% CI*: [0.184, 0.318]), centrality correlates with term frequency (r_s = .297, p < .001, *95% CI*: [0.228, 0.357]).

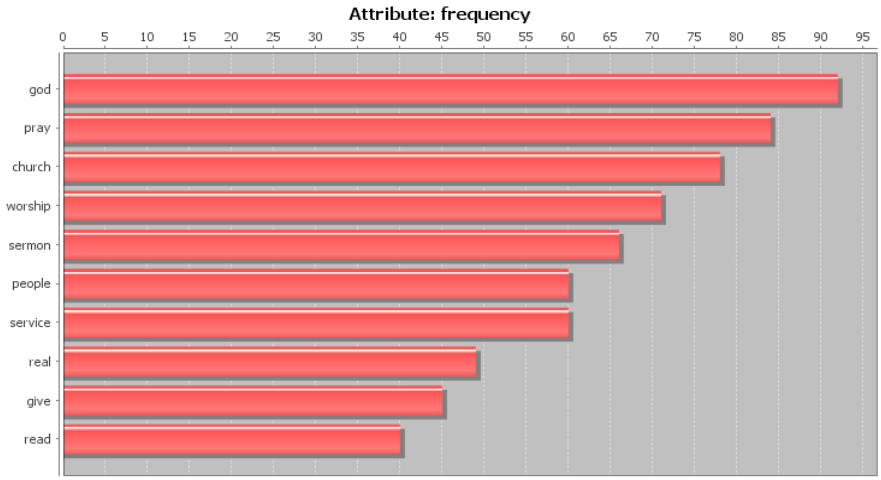


Figure 35. *Concepts by term frequency, Group 2.*

Appendix 4.4. Alternative Hypothesis Testing: Cultural Epidemiology

Here, the results of testing the alternative hypotheses AH1 and AH2 are included. The table below (Table 14) includes the results of the analysis. The analysis tests for significant differences in between-individual consensus between individuals with whom a participant has a link and those with whom the participant has no link. In this analysis, the statistics are run for each participant, with all other participants separated into one of two groups: link present or link absent. From there, the independent variable is assumed to be their between-individual consensus. The table reports the tests with the standard 2-tailed test as well as a 1-tailed test. When using a 1-tailed test, which assume a single directional relationship between the variables (and is less accepted in the literature), 8.1% of the sample (3 participants) showed significant differences in between-individual consensus; all three participants showed greater between-individual consensus with the individuals with whom they have a social connection. However, besides being less conventional, it is problematic to use a 1-tailed test here because it assumes a single directional relationship, which is hard to defend. Although the hypothesis is clear in the prediction that having a social network link should result in greater between-individual

consensus, it could also be the case that individuals are interacting based on homophily (i.e., those individuals with similar beliefs are more likely to maintain a social relationship).

Table 14

Results of Mann-Whitney U test with Monte-Carlo estimations.

Group	Participant	Directed / Undirected?	Is sig. 2-tail?	Is sig. 1-tail?	Mann-Whitney U	Z	Asymp. Sig (2-tailed)	Exact Sig	Monte Carlo Sig (2-tailed)	Monte Carlo Sig (2-tailed) Lower Bound	Monte Carlo Sig (2-tailed) Upper Bound	Monte Carlo Sig (1-tailed)	Monte Carlo Sig (1-tailed) Lower Bound	Monte Carlo Sig (1-tailed) Upper Bound
2	J140209	U	No	No	5	-1.184	0.236	0.308	0.312	0.303	0.321	0.157	0.15	0.165
2	J140210	U	No	No	10	-0.197	0.844	0.923	0.922	0.916	0.927	0.465	0.455	0.475
2	J140211	U	No	No	5	-1.184	0.236	0.308	0.304	0.295	0.313	0.154	0.147	0.161
2	J140212	U	No	No	0	0	0	0	0	0	0	0	0	0
2	J140217	U	No	No	11	-0.676	0.499	0.573	0.574	0.565	0.584	0.287	0.278	0.296
2	J140218	U	No	No	18	0	1	1	1	1	1	0.533	0.523	0.542
2	J140219	U	No	No	8	-1.183	0.237	0.287	0.287	0.278	0.296	0.14	0.133	0.147
2	J140220	U	No	No	0	0	0	0	0	0	0	0	0	0
2	J140222	U	No	No	3	-0.802	0.423	0.615	0.616	0.606	0.625	0.309	0.299	0.318
2	J140223	U	No	No	0	0	0	0	0	0	0	0	0	0
2	J140226	U	No	No	18	0	1	1	1	1	1	0.529	0.519	0.539
2	J140230	U	No	No	4	-0.535	0.593	0.769	0.768	0.76	0.776	0.386	0.377	0.396
2	J140242	U	No	Yes	2	-1.776	0.076	0.103	0.104	0.198	0.11	0.053	0.049	0.058
2	J140256	U	No	No	2	-1.069	0.285	0.462	0.465	0.455	0.474	0.227	0.219	0.235
1	J140201	U	No	No	0	0	0	0	0	0	0	0	0	0
1	J140204	U	No	No	16	-1.196	0.232	0.265	0.257	0.249	0.266	0.129	0.122	0.136
1	J140205	U	No	No	11	-1.028	0.304	0.364	0.362	0.353	0.371	0.176	0.168	0.183
1	J140206	U	No	No	18	-0.228	0.819	0.866	0.869	0.863	0.876	0.438	0.428	0.448
1	J140207	U	No	No	8	-0.394	0.694	0.818	0.817	0.809	0.824	0.409	0.399	0.418
1	J140208	U	No	Yes	5	-1.713	0.087	0.104	0.104	0.098	0.11	0.051	0.047	0.055
1	J140213	U	No	No	0	0	0	0	0	0	0	0	0	0
1	J140214	U	No	No	37	-0.811	0.417	0.449	0.445	0.435	0.454	0.218	0.21	0.226
1	J140221	U	No	No	39	-1.16	0.246	0.267	0.268	0.259	0.276	0.134	0.128	0.141
1	J140227	U	No	Yes	0	-1.655	0.098	0.091	0.091	0.086	0.097	0.045	0.041	0.049
1	J140228	U	No	No	10	-1.142	0.253	0.312	0.309	0.3	0.318	0.155	0.148	0.162
1	J140229	U	No	No	8	-0.394	0.694	0.818	0.82	0.812	0.828	0.416	0.407	0.426
1	J140232	U	No	No	0	0	0	0	0	0	0	0	0	0
1	J140233	U	No	No	36	0	1	1	1	1	1	0.516	0.506	0.526
1	J140234	U	No	No	35	-0.588	0.557	0.595	0.589	0.579	0.599	0.297	0.288	0.306
1	J140237	U	No	No	6	-0.709	0.478	0.636	0.641	0.632	0.65	0.316	0.306	0.325
1	J140243	U	No	No	0	0	0	0	0	0	0	0	0	0
1	J140244	U	No	No	0	0	0	0	0	0	0	0	0	0
1	J140246	U	No	No	33	-0.255	0.798	0.837	0.843	0.836	0.851	0.425	0.416	0.435
1	J140247	U	No	No	13	-0.799	0.424	0.485	0.483	0.473	0.492	0.243	0.234	0.251
1	J140248	U	No	No	13	-0.799	0.424	0.485	0.481	0.472	0.491	0.241	0.233	0.249
1	J140254	U	No	No	16	-0.457	0.648	0.701	0.705	0.696	0.714	0.353	0.343	0.362
1	J140255	U	No	No	16	-0.457	0.648	0.701	0.712	0.703	0.721	0.35	0.341	0.36

Table 15

Table of group sizes, means, and standard deviations for all samples used to test AH2.

Participant	Size group 1	Size group 2	Mean group 1	Mean group 2	SD group 1	SD group 2
J140204	19	3	0.004	0.003	0.001	0.001
J140205	20	2	0.004	0.003	0.001	0.001
J140206	20	2	0.002	0.002	0	0
J140208	20	2	0.005	0.017	0.002	0.014
J140214	16	6	0.004	0.004	0.002	0.001
J140221	14	8	0.004	0.004	0.001	0.001
J140228	20	2	0.003	0.003	0.001	0
J140233	18	4	0.005	0.004	0.002	0.002
J140234	17	5	0.004	0.001	0.004	0.001
J140246	18	4	0.004	0.004	0.002	0.001
J140247	20	2	0.003	0.004	0.001	0.001
J140248	20	2	0.002	0.002	0	0
J140254	20	2	0.004	0.004	0.001	0
J140255	20	2	0.003	0.003	0	0
J140209	11	2	0.003	0.004	0.001	0.001
J140210	11	2	0.004	0.004	0.001	0
J140211	11	2	0.003	0.004	0.001	0
J140217	10	3	0.002	0.003	0	0
J140218	9	4	0.004	0.001	0.004	0.002
J140219	10	3	0.003	0.004	0.001	0.001
J140226	9	4	0.003	0.003	0	0.001
J140242	11	2	0.004	0.006	0.001	0.001

Note: Group 1 constitutes those participants with whom there was no social network link. Group 2 constitutes those participants with whom there was a social network link. The means and standard deviations refer to between-individual consensus. Those participants who had too few links in their sample to calculate the power analysis have been removed from the table

Appendix 4.5. Dual Mediation Regression Model Results

In order to test the main hypothesis, that the relationship between frequency of in-group ritual attendance and within-group consensus is mediated a) positively by social identification and b) negatively by fusion, a dual mediation model was developed using Model 4 of the PROCESS

macro for SPSS (Hayes, 2014). A visual depiction of the model schematic is provided below with the effects and 95% confidence intervals labelled for all regressions in Figure 36 below.

Testing this mediation model revealed that frequency of in-group ritual attendance had a direct effect on within-group consensus (*B* = -0.01; *SE* = 0.003; *t* = -3.21; *p* < .01; *95% CI*: [-0.02, -0.004]). In line with the prediction of the IIS, social identification had a negative mediation effect (*B* = -.002; *SE* = .002; *95% CI*: [-.01, -.0002]) and fusion had a positive mediation effect (*B* = .003; *SE* = .001; *95% CI*: [.001, .007]) on within-group consensus. Results of individual relationships are depicted in Figure 36 below. Sobel's test of indirect effects was not significant for either fusion with the group (*B* = 0.003; *SE* = 0.002; *Sobel's z* = 1.53; *p* = .13) or social identification (*B* = -0.002; *SE* = 0.002; *Sobel's z* = -1.21; *p* = .23). When mediation models with multiple mediators have opposite effects, it is possible that Sobel's test is insignificant because it assumes independent additive effects (Judd & Kenny, 2010; MacKinnon, Lockwood, Hoffman, West, & Sheets, 2002; MacKinnon, Warsi, & Dwyer, 1995), resulting in a Type II error. Therefore, bias corrected bootstrapped confidence intervals (calculated with 5,000 bootstrapped samples) are reported (as suggested by Hayes & Scharkow, 2013; Preacher & Hayes, 2008; also see Shrout & Bolger, 2002 for a discussion of the merits of bootstrapping for small samples). It is important to keep in mind that within-group consensus is measured by a responses distance from the lossy intersection matrix; therefore, the negative mediation effect found for social identification suggests that social identification has a positive effect on within-group consensus, while the positive mediation effect found for fusion suggests that fusion has a negative effect on within-group consensus.

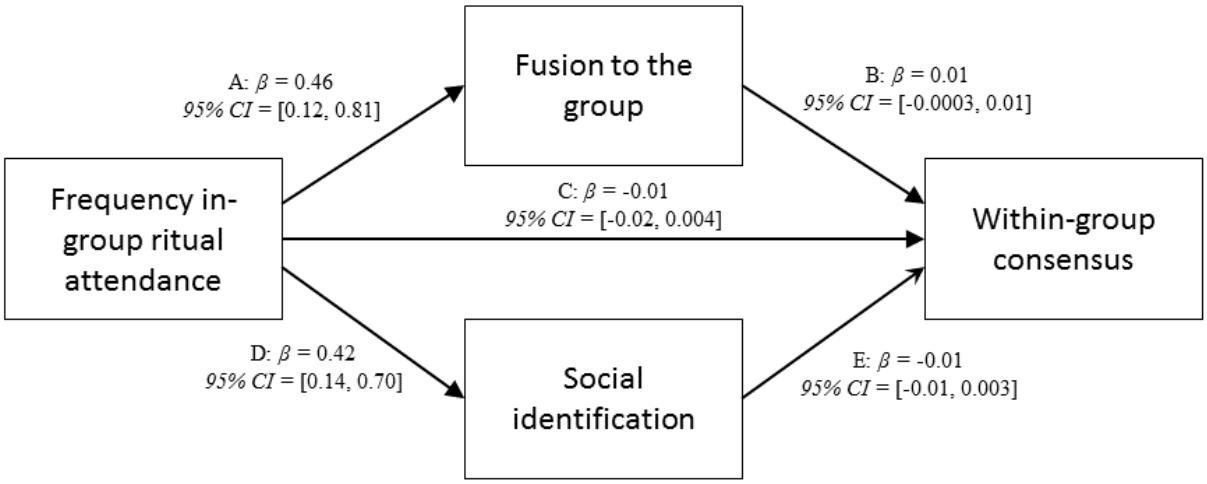


Figure 36. Mediation model testing the hypothesis that the relationship between frequency of in-group ritual attendance and within-group consensus is mediated positively by social identification and negatively by fusion.

Running the individual components of this mediation model as linear regressions found that the assumption of normality was violated in the relationships between frequency of in-group ritual attendance and social identification ($W_{(33)} = .90$, $p = .01$), frequency of in-group ritual attendance and fusion ($W_{(33)} = .80$, $p < .01$), and frequency of in-group ritual attendance and within-group consensus ($W_{(33)} = .71$, $p < .01$).

Additionally, post-hoc analysis revealed the sample size is smaller than the calculated minimum sample size for indirect effect mediation models (Fritz & Mackinnon, 2007).

Appendix 5. Interview Prompts

1) **On a usual Sunday when you go to church, what are the different things that are done during the service?**

   What is the significance or meaning to you, for those actions (i.e., parts of service)?
   (REPEAT FOR ALL ACTIONS LISTED)

2) *IF the participant didn't mention the Holy Communion as part of the usual Sunday service ask:*
   What, for you, is the meaning behind the Holy Communion?

3) **For you, what's the best part of Sunday service/What do you like most about your church?**

   a. How many close friends do you speak with frequently from your church? (This includes weekly fellowship meetings/CG/Prayer groups/etc.)

4) **Were you born a Christian?**
   IF the answer is No ask:

   How did you convert?

   Were you religious before you became Christian?

5) **Have you ever had a feeling of being born again, baptized in the Holy Spirit, or some other deep emotional experience of your faith?**

6) **Have you ever gone on a church retreat or to a large evangelical conference meeting?**
   IF the answer is Yes, ask:

   How frequently have you gone to one of these meetings?

7) **How long have you been a part of the church?**