



**INVESTIGATING THE ROLE OF
SELF-SACRIFICING PROSOCIALITY
IN INTRAGROUP AND INTERGROUP CONTEXTS**

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SCHOOL OF SOCIAL SCIENCES
2020**

**INVESTIGATING THE ROLE OF
SELF-SACRIFICING PROSOCIALITY
IN INTRAGROUP AND INTERGROUP CONTEXTS**

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A thesis submitted to the Nanyang Technological University
in partial fulfilment of the requirement for the degree of
Doctor of Philosophy

2020

Statement of Originality

I certify that all work submitted for this thesis is my original work. I declare that no other person's work has been used without due acknowledgement. Except where it is clearly stated that I have used some of this material elsewhere, this work has not been presented by me for assessment in any other institution or University. I certify that the data collected for this project are authentic and the investigations were conducted in accordance with the ethics policies and integrity standards of Nanyang Technological University and that the research data are presented honestly and without prejudice.

18 January 2020

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Jan 18th, 2020

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Date



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Assistant Professor Bobby K. Cheon

Authorship Attribution Statement

This thesis contains material from one paper published in the following peer-reviewed journal in which I am listed as an author.

Selected findings from Chapter 3, 4, and 6 are published as Katna, D., and Cheon, B. K. (2019). Towards the need to discriminate types of attackers and defenders in intergroup conflicts. [Commentary on “Revisiting the form and function of conflict: Neurobiological, psychological, and cultural mechanisms for attack and defense within and between groups” by De Dreu, C. K. W. & Gross, J.]. *Brain & Behavioural Sciences*, 42(e127), 25-26. DOI: 10.1017/S0140525X19000839

The contributions of the co-authors are as follows:

- A/Prof Cheon provided the initial project direction and revised the manuscript drafts.
- I collected data, carried out analysis, and prepared the manuscript drafts under the supervision of A/Prof Cheon.

18 January 2020



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Acknowledgements

This thesis would not have been possible without the support of several key individuals. Firstly, I am truly indebted and thankful to Assistant Professor Bobby K. Cheon for his unconditional mentorship and meticulous reading of my work throughout the graduate programme. His continuous guidance and directions in the development of our research ideas and studies have strongly inspired me to explore new and unknown perspectives. I would additionally like to convey my gratitude to my thesis advisory committee members, Associate Professor Wan Ching Catherine and Associate Professor Georgios Christopoulos for their valuable advice on drafts of this thesis. Finally, I would like to thank my friends and family for their unwavering encouragement over the years.

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Summary

Parochial cooperation theories assume that strongly self-sacrificing members primarily desire and seek to achieve ingroup-favouring outcomes, and consequently become prepared to bear extreme costs to themselves. This altruism to help, however, does not always extend into intergroup contexts. Instead, the motivation to harm outgroups may surpass the motivation to enhance the ingroup's welfare. Such occurrences challenge the principal premise of parochial cooperation accounts, underscoring not all highly self-sacrificing members may prioritize outcomes of ingroup well-being over outgroup harm. The central hypothesis of this thesis predicted that individuals who are highly self-sacrificing towards the ingroup in intragroup settings would strongly anticipate hostility from the outgroup, and in consequence, would harm the outgroup relative to exclusively ensuring instrumental ingroup benefit, ingroup gain at the outgroup's expense, or personal gain in intergroup settings. This relationship was conceptualized as the *Costly Self-sacrificial Aggression* (CSA) framework and tested using six studies. Studies 1 to 3 employed decision-making tasks in minimal group paradigms. Participants played an intragroup task that measured their self-sacrificing prosociality, followed by an intergroup task which measured personally-costly pursuit of outgroup aggression. Studies 1 ($N = 120$) and 2 ($N = 210$) showed that self-sacrificing prosociality was positively predictive of outgroup harm. Study 3 ($N = 106$) found that self-sacrificing prosociality was associated with increased outgroup aggression, among members with high anticipations of outgroup hostility, only in the absence of outgroup threat. Studies 4 to 6 integrated the findings into a serial mediational pathway from identity fusion to outgroup aggression, through

self-sacrificial readiness and anticipations of outgroup hostility. The studies utilized real group identities, issues, and perceptions within the U.S. context. Studies 4 ($N = 299$) and 5 ($N = 376$) revealed indirect effects of U.S. identity salience on restrictive policies toward outgroups like radical Islamic groups and malicious foreign organisations, that emerged through increased self-sacrificial readiness and anticipated outgroup hostility. Study 6 ($N = 164$) found that social identity complexity negatively predicted support for punitive policies toward an outgroup, through greater perceived distinctiveness of ingroup memberships, unwillingness to self-sacrifice, and anticipations of outgroup positivity. The studies largely examined U.S. samples which may limit external validity. Building on one another, the studies demonstrate consistent support that serves as preliminary confirmatory evidence for the CSA framework, implying that highly self-sacrificing members may initiate and posture outgroup aggression as a strategic priority in intergroup conflicts.

GLOSSARY

This section presents terms applied in this thesis (in alphabetical order).

- Anticipations of outgroup hostility* : Expectations of potential harm from members of the outgroup that target members of the ingroup
- General (or Universal) prosociality* : An inclination to benefit the well-being of members in the ingroup and outgroups
- Identity fusion* : An individual difference in feelings and perception of a strong, visceral sense of ‘oneness’ (i.e., overlap) between personal and social identities
- Ingroup benefit* : An inclination to solely enhance the instrumental well-being of the ingroup and its members
- Ingroup defence* : An inclination to solely protect the instrumental well-being of the ingroup and its members
- Outgroup aggression* : An inclination to exclusively harm members of outgroups
- Retributive justice orientation* : A disposition to perceive mandatory and proportionate punishment for perceived transgression

- Self-sacrificing prosociality* : An inclination and expression of strong ingroup allegiance to voluntarily accept extreme personal costs so as to benefit and safeguard the welfare of non-genetic members who are part of the ingroup. This term will be referred to as self-sacrificial readiness in Chapters 6 to 9.
- Social identity complexity* : An individual difference in perception of cognitive representations of multiple social group memberships
- Vengeance* : A disposition to inflict harm in return for perceived wrongdoing

1. CHAPTER 1: INTRODUCTION

1.1. The transition from ingroup positivity to outgroup negativity

“How might the pervasive human willingness to fight (the outgroup) and die for the ingroup ... which makes lethal war possible be explained” (Campbell, 1965, pp. 293, as cited in Halevy et al., 2012, pp. 1)? Moving forward fifty years later, U.S. National Intelligence Director James Clapper echoed a similar view toward the overwhelming success of the Islamic State as it transformed from a fringe offshoot to a global threat in early 2013 that *“[i]t boils down to predicting the will to fight, which is an imponderable”* (Ignatius, 2014). Seeking answers to why devout ingroup members may self-sacrifice to harm the outgroup would entail an analysis into how and when does ‘ingroup love’ become ‘outgroup hate’ (Brewer, 2001).

Still prevailing as an evolutionary conundrum, cooperation between non-biologically affiliated individuals has been a primary adaptive strategy for humans to survive and thrive across ancestral and modern societies. Through the costly efforts of such self-sacrificing members, the benefits are shared with other non-co-operator members in the ingroup¹. Segal et al. (2018) showed that residents in New Zealand who recalled their experiences during the Christchurch earthquake in 2011 reported greater levels of identity fusion with the city of Christchurch and were highly willing to donate their funds to help the victims and volunteer their time to rebuild the city. Kavanagh et al. (2018) found that, Brazilian Jiu Jitsu practitioners who reported positive experiences of

¹ Members in the ingroup refer to those individuals who share a given group membership with other target individuals. Members in the outgroup refer to individuals who are members of other groups and who do not share that group membership with other target individuals (Böhm et al., 2018).

engaging in rank promotion rituals that involved physical stress endurance and painful bruises from belt-whipping gauntlets were positively associated with high levels of fusion with Jiu Jitsu martial arts schools, predicting greater willingness to support and engage in costly sacrifices such as donating money, time, and risking their lives for their schools. Examining prosocial differences toward Hindu devotees who participated in low (such as collective prayers) or high (such as body piercings) religious ordeals in Mauritius, Xygalatas et al. (2013) showed that performers and observers of high ordeal rituals which signalled costly displays of group commitment was associated with greater levels of monetary donations to the temple than participants who engaged in low ordeal rituals. These studies illustrate that individuals with strong commitment toward the ingroup may readily self-sacrifice to benefit their group members, through dysphoric experiences.

Not limited to intragroup situations, performing costly self-sacrifices to benefit fellow ingroup members during intergroup conflicts can be regarded as a sound, well-reasoned decision rather than out of impulsivity and imprudence. Broadly defined as social situations involving the perceived incompatibility of values and/or goals amongst members belonging to two (or more) groups, attempts undertaken by the members to dominate one another, and antagonistic feelings expressed by members in rival groups toward each other (Böhm et al., 2018; Fisher, 1990), participation in intergroup conflicts may generate similar, if not greater, personal costs such as time, money, physical effort, and risks of injury or death compared to intragroup circumstances. When confronted with outgroups that compete and pose threat to the security of resources and safety of the ingroup, its members may desire to either free-ride on the contributions

of highly self-sacrificing members, seek to benefit the group by incurring extreme personal costs to solely and efficiently ensure well-being of the ingroup, or maximize benefits for the ingroup and harm toward the outgroup through parochial altruistic behaviours. Adding to the complex set of decisions, evidence from real-world conflicts, naturalistic studies, and experimental scenarios reveal that highly self-sacrificing members may additionally choose to prioritize harm toward the outgroup relative to exclusively seeking instrumental benefits for the welfare of their ingroup (Parker & Janoff-Bulman, 2013).

Displaying their unfaltering readiness to ‘repel, fight, and sacrifice’ (Qawasme, 2018), close to 35,000 Palestinian demonstrators who were gathered at the Gaza borders to protest for their ‘right to return to their ancestral homes’, confronted Israeli security forces that were monitoring the borders with ‘Molotov cocktails, burned tyres, stones’ (Al-Mughrabi & Heller, 2018). Over 2,700 protesters were wounded and were at risk of sustaining injuries of ‘permanent disability’ (Lee et al., 2018). In contrast, smaller groups of demonstrators employed non-violent methods of resistance to express their discontentment and promote the group cause such as conducting reading chains, pray-ins, and planting olive saplings near the border fences which could provide social and economic gains for the group (Fleischmann, 2018). Though endowed with a remarkable yet perplexing capacity to self-sacrifice for genetically unrelated individuals, what remains far more puzzling and unresolved from observations of these perpetrators, is why and how members who willingly shoulder extremely high costs to themselves for the group in intragroup contexts would self-sacrifice to harm outgroups over continuing to solely

increase instrumental benefits for the welfare of their group in intergroup contexts.

On a broader, theoretical level, the study of intragroup cooperation and intergroup conflict points to how highly self-sacrificing members calibrate their decisions and actions toward ingroup positivity ('ingroup love') and outgroup negativity ('outgroup hate'). The extant social psychology literature on various forms of intergroup bias and hostility chiefly attribute the dominant motive of intergroup conflict to strong ingroup love and to a lesser extent, outgroup hate that can range from positivity, indifference, to violence (De Dreu et al., 2010; Halevy et al., 2008; 2012). However, a closer scrutiny of the ingroup positivity and outgroup negativity continuums may suggest that positive ingroup attitudes may not be independently sufficient to explain intergroup conflict (Brewer, 1999). Furthermore, how might asymmetric motivations of ingroup positivity and outgroup negativity may propel intergroup conflict have not been distinguished empirically (Buttelmann & Böhm, 2014).

The notion of how highly self-sacrificing ingroup members may give precedence to harm the outgroup than solely seek instrumental benefit for the welfare of the ingroup was implied by Greenwald and Pettigrew (2014), who noted the scarcity of studies that examined how ingroup – outgroup differences in negative evaluations relative to positive evaluations, may fuel intergroup hostility. Calling for more inquiry in these areas, Lehr et al. (2017) remarked the scarcity of studies that define the conditions under which ingroup positivity may not be the dominant motivation in intergroup conflicts, while Buttelmann and Böhm (2014) advocated for motives for competitiveness and pure harm intended to the outgroup to be distinguished on a behavioural level.

Regardless of perceived/imagined or actual threats from the outgroup, highly self-sacrificing members may cognize to overcome the potential harm from the outgroup by engaging in direct and preventative aggression. Employing aggressive actions may protect and buffer the ingroup against the consequences and impact of the threat imposed by the outgroup (Reicher et al., 2008), relative to exclusively increasing instrumental benefits for the welfare of the ingroup. The transition from self-sacrificial motivations for the ingroup in intragroup contexts to self-sacrificial motivations to harm the outgroup in intergroup contexts intimate the role(s) of intermediary, core individual dispositions and precipitating contextual factors.

The primary aim of this thesis is to **ascertain pivotal determinants and mechanisms, in person and contextual domains, that potentiate members to prioritize and manifest their self-sacrificing tendencies for the ingroup in intragroup contexts as behaviours that harm the outgroup, rather than directly, solely and tangibly benefit their ingroup in intergroup contexts.**

Specifically, members with high self-sacrificial readiness toward their group could strongly anticipate potential hostility from the outgroup, even when there is a clear absence of direct threat from the outgroup. To highly self-sacrificing members who desire to protect their ingroup from dangers, these anticipations of outgroup hostility may resultantly generate harmful actions toward the outgroup over actions that directly and exclusively provide instrumental ingroup benefit. For highly self-sacrificing members, the psychological mechanism of anticipated outgroup hostility is proposed to translate motivations of ingroup welfare in intragroup contexts to motivations of outgroup aggression in intergroup contexts. This research thesis seeks to chart

out interlinked factors that may strengthen as well as reverse the proposed association between self-sacrificing prosociality in intragroup contexts and outgroup aggression in intergroup contexts, situated within simulated and real-world environments. Taken together, these observations from recent research on intergroup relations beget critical and rarely addressed knowledge gaps about, ultimate and proximate, factors and processes that determine why and how members who are prepared to unconditionally self-sacrifice for their group, would prioritize and engage in destructive acts aimed at the outgroup over constructive actions that solely and tangibly benefit the ingroup. These intrinsic and extrinsic markers could discriminate highly self-sacrificing members from less self-sacrificing members on increasingly negative attitudes and retaliatory behaviours against outgroups. Uncovering dominant precursors which might govern preferences and behaviours to make self-sacrifices and harm the outgroup, may expound a fine-grained understanding of the judgement and decision-making trajectories that actuate highly self-sacrificing members like frontline combat soldiers (Greiner, 2014), cult followers (Box & McCormack, 2004), and suicide bombers (Sheikh et al., 2016), thus providing insightful research and practical directions to avert intergroup conflict and its repercussions.

1.2. Thesis structure

This section will lay out an overview of the chapters and the major research questions broadly. The following section in this chapter will present the novel contributions made by the thesis in terms of theory and methodology. The structure of this thesis follows a progression of three components that are

interdependent and build upon one another. The first component will establish the hypothesized, positive association between self-sacrificing prosociality and outgroup aggression (Chapter 3). The second component will provide further confirmatory evidence for the pathway and explore specific individual dispositions and contexts that strengthen this proposed relationship (Chapters 4 and 5). The third component will outline mechanisms emerging from specific dispositional and contextual interactions that may strengthen and weaken this relationship (Chapters 6 to 8).

Chapter 2 will introduce the construct of self-sacrificing prosociality, followed by the conceptualized CSA framework and its underlying theoretical framework from which the research questions have been developed and which support the findings in the data chapters. The first part of Chapter 2 is dedicated to a review of past psychological research on the nature and emergence of self-sacrificing prosociality in intra- and intergroup contexts, which then funnels to the conceptualized CSA framework. The second part of Chapter 2 will focus on the evaluation of alternative intergroup theories relating to self-sacrificing prosociality and its positive relationship to outgroup aggression in explaining motives underlying intergroup conflict. This literature review will lend support to the theoretical framework of this thesis. It will elucidate the theoretical background behind self-sacrificing prosociality based on the identity fusion theory, the purported person- and situational-centric, moderators and mediators of self-sacrificing prosociality (i.e., heightened retaliatory thinking and anticipated outgroup hostility in the absence of direct threats and presence of ambiguous threats in intergroup contexts), and the downstream consequences of self-sacrificing prosociality (i.e., prioritization of intent and behaviours of

outgroup aggression over ingroup benefit and personal gain). Chapter 2 will conclude by presenting the methodological approach utilized for this thesis.

Chapters 3 to 8 are empirical, beginning with the development and testing of the proposed association between self-sacrificing prosociality and outgroup aggression through an exploratory study. In Chapter 3, the purpose of the research study was to first establish the positive relationship between self-sacrificing prosociality in intragroup contexts and outgroup aggression in intergroup contexts relative to ingroup benefit and self-interest. The study further investigated whether self-sacrificing prosociality would mediate the relationship between identity fusion and outgroup aggression. Two decision-making games were employed to test whether self-sacrificial motives in the intragroup game would predict the self-sacrificial motive for ingroup benefit, parochial cooperation, and/or personal gain in the intergroup game.

After establishing the hypothesized association, Chapters 4 and 5 will present findings that tested the effects of two potential moderators of the proposed association. Chapter 4 tested whether the relationship between self-sacrificing prosociality in intragroup contexts and outgroup aggression in intergroup contexts would be stronger for individuals with retaliatory thinking. This study employed a modified version of the decision-making, gametic approach to determine whether self-sacrificial motives in the intragroup game would predict the motive for ingroup benefit, parochial cooperation, outgroup harm, and/or personal gain across varying threat severity from the outgroup in the intergroup game.

Chapter 5 tested the role of anticipations of outgroup hostility in the association between self-sacrificing prosociality in intragroup contexts and

outgroup aggression in intergroup contexts. In this study, the payoffs and costs employed in the intra- and intergroup decision-making games were amended to incorporate perceptions of ostensibly real, physical harm that could be inflicted onto the ingroup, outgroups, and individual members. Volunteering to hear different durations of aversive noise for group members in the intragroup game was used as a predictor of the motive for ingroup harm, outgroup harm, harm to both ingroup and outgroup, and/or keeping the harm for oneself (i.e., general/universal prosociality) during the absence and presence of outgroup threat in the intergroup game.

The next three chapters (6, 7, and 8) will explore the associations among identity fusion, self-sacrificing prosociality, retaliatory thinking, anticipated outgroup hostility, and outgroup aggression as a formalized pathway in more detail. Chapters 6 to 8 will contextualize the empirical studies using the U.S. society which serves as a relevant, social context that encompasses real and salient group identities as well as intergroup perceptions and interactions. Chapter 6 will investigate the CSA framework, where highly fused individuals are predicted to be more likely to engage in aggressive intent and actions toward outgroups, through elevated levels of readiness to self-sacrifice and anticipated outgroup hostility. Chapter 6 will provide initial and direct evidence for the pathway that predicts support for outgroup harm policies and actions over policies that directly and clearly benefit the ingroup.

Chapter 7 will test whether the formalized pathway would specifically emerge in response to ambiguous outgroup threats in intergroup contexts compared to ambiguous non-outgroup threats in intragroup contexts. Having measured perceptions toward radical, socio-religious groups within the U.S.

society (Chapter 6), this study will employ an international setting that assesses perceptions of U.S. – China political and bilateral relations. This study tested whether highly self-sacrificing members in intergroup contexts would be more likely to appraise outgroup aggression as actions of concern for ingroup well-being, compared to highly self-sacrificing members in intragroup contexts.

Chapter 8 will examine the effect of high social identity complexity in reversing the pathway from self-sacrificing prosociality in intragroup contexts and outgroup aggression in intergroup contexts. This chapter hence could provide a starting point for the development of plausible intervention strategies to reduce the inclinations for outgroup aggression and its antecedents in the proposed pathway. Lastly, in Chapter 9, a discussion of the data chapters will bring together the key findings in relation to the hypothesized association. After drawing together the research findings, this chapter will discuss areas of limitations of the thesis, theoretical and practical implications, and directions for future work.

2. CHAPTER 2: LITERATURE REVIEW

2.1. What is self-sacrificing prosociality and how it affects intergroup relations?

2.1.1. Self-sacrificing prosociality in *intragroup* contexts

Bravely coming forward to defuse one of the most hazardous nuclear meltdowns in history were the Skilled Veterans Corps (Lah, 2011). Comprised only of retirees aged 60 and above, the 250-member team of Japanese elders volunteered to work in the radiation-contaminated Fukushima Daiichi nuclear plant to protect younger workers from possibly developing health concerns in the future (Lah, 2011). In the aftermath of the 7.1-magnitude earthquake that collapsed buildings in Mexico City in 2017, the Los Topos convened its members to rescue trapped victims under huge, unstable rubble (Martin & Cattan, 2017). Coming together spontaneously as Mexicans, the Los Topos put their day jobs on hold and do not receive compensation for their high-risk operations to crawl through the debris and pull out survivors (Webber, 2017). Attested in many avenues of social life, costly cooperation is contingent on members who are willing to make sacrifices for other genetically unrelated people who share the same group membership. Members who cultivate strong feelings of attachment with the group may assume personal responsibility to protect the group (Swann et al., 2014). Such members accordingly could develop extremely strong vigilance to detect potential dangers and a large risk appetite to self-sacrifice in eliminating the threats (Whitehouse et al., 2014). In an intragroup setting, self-sacrificing members may volunteer themselves for actions that involve extreme risk and aim to ensure the action is fully optimized to benefit the ingroup.

This thesis will utilize a working definition of self-sacrificing prosociality conceived by Batson and Powell (2003) and Bélanger et al. (2014), wherein it refers to **inclinations and expressions of strong ingroup allegiance to voluntarily accept extreme personal costs so as to benefit and safeguard the welfare of non-genetic members who are part of the ingroup**. A scenario that could illustrate self-sacrificing prosociality could be citizens who come forward and risk their lives to rescue victims during national disasters regardless of extreme dangers that they may face and expectations of others to contribute toward the group efforts (Lah, 2011; Sanchez, 2017). Self-sacrificing prosociality emphasizes the atypical readiness to volunteer oneself to take action that involves extreme personal costs so as to protect and benefit the ingroup (Kavanagh et al., 2019; Sachdeva et al., 2015). This proactive nature makes self-sacrificing prosociality unique compared to other ‘ingroup love’ constructs such as identity fusion, ingroup entitativity, and group loyalty that are defined by and focus heavily on pro-group perceptions, attitudes, and feelings rather than behavioural outcomes. Such ingroup-favouring constructs may motivate and produce self-sacrificial behaviours whilst self-sacrificing prosociality is demonstrated by the behavioural intent and/or the sacrificial action itself.

2.1.2. Self-sacrificing prosociality in *intergroup* contexts

During intergroup conflicts, the underlying dominant motives of costly cooperation can be generally classified as benefiting, neglecting, or harming (Aaldering & Böhm, 2020). Members could strive to benefit both the ingroup and the outgroup alike, indicative of general/universal cooperation (Aaldering

& Böhm, 2020; Buchan et al., 2009). Motivated to neglect, individuals might aim to benefit the ingroup rather than the outgroup where they neither actively harm nor help outgroup members (Aaldering et al., 2018; Aaldering & Böhm, 2020). Lastly, they might opt to engage in active aggression against the outgroup (Böhm et al., 2016). These preferences can result in diametrically opposite outcomes within intergroup situations, ranging from collaborative coalitions to strifes and violence (De Dreu et al., 2014).

Although ingroup benefit (that enhances the welfare of the ingroup) has been illustrated as the primary motivation and leading decision in intergroup conflicts (De Dreu et al., 2015; Halevy et al., 2008), individuals willingly make substantial contributions to harm an outgroup rather than solely and clearly seek tangible benefits for the ingroup (Cacault et al., 2015; Weisel & Böhm, 2015). Highlighting the ingroup – outgroup differentiation, Brewer (2007) put forward that ingroup positivity is “psychologically primary” (as cited in Brewer, 2017, pp. 93) and “may be a necessary but not sufficient cause of intergroup hostility” (pp. 733). For members with strong self-sacrificing prosociality, perceived fears of security that threaten and destabilize ingroup positivity could be a definitive factor that precipitates outgroup negativity such as distrust, social comparison, and conflict, even with realistic competition for tangible or symbolic resources being absent. When threat from the outgroup is perceived as exceedingly high and the survival likelihood for the ingroup is low, a large number of members in the ingroup who are willing to accept extreme personal costs may pave way for higher chances of ingroup success and well-being in comparison to a rival outgroup that could incur a heavy loss (Atran et al., 2014). With a substantial proportion of its members who harbour the willingness to undertake extreme

sacrifice, the ingroup would be able to outsize and incapacitate the threat from the outgroup which could consist of fewer strongly committed members who would be willing to disregard the costs of self-sacrificing for their group (Atran, 2016).

There have been limited investigations about the mechanisms that underlie why self-sacrificing members may engage in ‘pure’ outgroup aggression that may be unprovoked (occur in the absence of clear outgroup aggression) or may not efficiently and instrumentally benefit the fitness and welfare of the ingroup. Unlike ‘ingroup love’ constructs that encourage self-sacrificial behaviours which are intended and performed for the welfare of group such as saving the lives of group members (Buhrmester et al., 2015) and protecting group values (Kossakowski & Besta, 2018; Sheikh et al., 2014), self-sacrificing prosociality may yield self-sacrificial behaviours to aggress against the outgroup over solely tangible benefit for ingroup members and oneself. Aggressive acts may have been generated from subjective perceptions such as feelings of defending their group and evoking fear among the rival groups, which could indicate symbolic ingroup benefit. Acts of outgroup aggression may include motivations for ingroup benefit such as symbolic gains in terms of instilling fear and respect toward the group. While symbolic benefit of outgroup aggression can be challenging to address, isolate, and measure, this thesis will seek to focus on why highly self-sacrificing members would prioritize and engage in destructive acts aimed at the outgroup over constructive actions that solely and tangibly benefit the ingroup. Specifically, this thesis will not aim to identify or determine conditions in which outgroup aggression is entirely driven by motivations of outgroup negativity rather than that of ingroup positivity.

2.2. Limitations of alternative theories that may explain the association between self-sacrificing prosociality and outgroup aggression

Proponents of evolutionary psychology (EP) emphasize that natural selection pressures could explain puzzling group behaviours like non-genetic altruism and costly aggression observed in modern societies. EP approaches suggest that, through simple acts of help, one builds his/her reputation as a credible and altruistic individual which would likely be rewarded by others through direct and indirect reciprocation (Wu et al., 2016). Interpersonal reciprocity between persons may extend to a larger group of non-kin cooperators who help one another, thus fostering intragroup solidarity.

In line with the cultural group selection hypothesis which predicts large-scale cooperation, altruistic and self-sacrificial tendencies may be central dispositional adaptations to be successful when competing for survival resources with other feuding groups (Tomasello et al., 2012). EP studies propose that tribalistic propensities and various forms of intergroup conflict like suicide terrorism and wars, that are rooted in coalitional aggression, continue to exist as such behaviours proffer adaptive advantages such as increased status and stipends for biological and fictive kin (Liddle et al., 2010). Yet, EP models lack empirical support on how long-term temporality may affect growth rates of cooperative groups as members self-sacrifice and plausible asymmetric risks and benefits between attacker and defending groups (Rusch, 2014), reducing its applicability to explain real-world cooperation and conflict.

This literature review will present an assessment of two theories that are rooted in perspectives of evolutionary psychology and may plausibly expound the proposed relationship between self-sacrificing prosociality in intragroup

contexts and outgroup aggression in intergroup contexts. The review will discuss the utility and limitations of (1) the theory of parochial cooperation (De Dreu et al., 2012) and (2) the theory of bounded generalized reciprocity (Yamagishi & Kiyonari, 2000) for explaining how members who willingly self-sacrifice for their group in intragroup contexts may become willing to self-sacrifice to harm outgroups over solely continue provide instrumental benefit for the ingroup. The theory of parochial cooperation predicts that members, who are motivated by ingroup positivity, contribute personal resources to help the ingroup and simultaneously harm the outgroup. The theory of bounded generalized reciprocity purports that expectations of reputation and reciprocity motivate desires to increase ingroup welfare in absolute terms in which members contribute to the ingroup at a personal cost.

Thus, the two theories may serve as alternative explanations of ingroup-bounded, parochial cooperation on how individuals with strong ingroup bias (positive discrimination for the ingroup) may readily incur personal costs to aggress against the outgroup (negative discrimination against the outgroup) without solely and directly enhancing ingroup well-being. Self-sacrificing prosociality is centred on the intragroup context, which differs from processes that motivate personally costly behaviours that benefit ingroup members in intergroup contexts, such as parochial altruism (De Dreu et al., 2014) or ingroup favouritism emerging from bounded generalized reciprocity (Yamagishi & Kiyonari, 2000).

2.2.1. The Theory of Parochial Cooperation

First proposed by Darwin, the parochial cooperation (or altruism) model of the intragroup cooperation - intergroup aggression developed by De Dreu et al. (2012; 2014) puts forward that members in a group are motivated toward two co-evolved processes which are to protect and promote ingroup positivity, and simultaneously derogate and fight against rivaling outgroups (Balliet et al., 2014). The model submits that individuals generally prefer cooperation with ingroup to that of outgroup members, and manifest parochial cooperative behaviours where they tend to willingly shoulder costly, self-sacrificial actions when outgroup aggression is perceived as salient (Choi & Bowles, 2007). Though participation in intergroup conflict can involve costly sacrifices for the individual, collective success that is eventually achieved can lead to indiscriminate benefits for members in the ingroup (Balliet & Van Lange, 2013; Thielmann & Böhm, 2016). Yet, the theory of rational choice predicts that, in social dilemmas where non-cooperation would penalise all members, individuals will still relentlessly and instinctively opt to maximise their personal gains and interest over shared good and benefit for the ingroup (Halali et al., 2017). In an intragroup setting, the selfish strategy to unilaterally maximize personal welfare can backfire because an inevitable situation is created in which every member would suffer more (Balliet & Van Lange, 2013; Halali et al., 2017). In a set of decision-making experiments conducted by Van Vugt et al. (2007), participants were asked to play a public-goods game in six-member groups that either competed or did not compete against different groups of individuals from rival universities. Participants were provided with an individual pool of money that they could keep for themselves or contribute to

their group. Supporting the theory that cooperation with the ingroup increases with the presence of intergroup conflict, allotments to benefit the ingroup were found to be higher in the intergroup competition condition compared to the no-intergroup competition condition (Van Vugt et al., 2007). In an analysis of experimental studies by Yamagishi and Mifune (2016), intragroup cooperation and intergroup aggression were suggested to be negatively correlated rather than a positive coevolution as assumed by the parochial altruism theory. In these studies, the factors underlying intragroup cooperation and intergroup aggression were derived from intergroup settings (Yamagishi & Mifune, 2016), which may not precisely measure the role of intragroup cooperation.

In their meta-analysis about the factors and effects of parochial altruism in cooperation games, Balliet et al. (2014) showed that parochial cooperation could be motivated by reputation concerns and indirect reciprocity. The findings showed that parochial cooperation was found to be strong and present when other players had knowledge of the group membership of the decision maker, and that greater levels of cooperation were expected from members in the ingroup than members in the outgroup, which indicated strong trust between ingroup members to cooperate with one another. Such parochial co-operators in a group may be motivated to incur personal costs because they expect favours in return for their sacrifices from ingroup members as well as to keenly maintain their individual standing in the group, which may suggest selfish interest.

Closely linked to the parochial altruism theory, is the male warrior hypothesis that assumes the coevolutionary processes of cooperation with each other and aggression against the outgroup, enabling men to form 'bands of

brothers' coalitions and execute aggression against members of outgroups with the prime objective of securing or defending resources that aid reproduction. The ingroup bias mechanism may develop from expectations of reciprocity among ingroup members (Balliet et al., 2014; Yamagishi & Mifune, 2009).

Nawata (2019) examined the relationships between honour culture, social incentives presented to warriors, and intergroup clashes in preindustrial societies. The findings showed that social rewards such as respect, praise, gifts, and ceremonies fully mediated the relationship between upholding the honour culture through values of masculinity and courage and the frequency of engagement in intergroup conflicts (Nawata, 2019). This study may imply that committed members who are willing to self-sacrifice their group may be motivated external, material and symbolic incentives that are presented by other ingroup members in return for their self-sacrificial efforts, to actively participate in intergroup conflict. These studies suggest how costly contributions that benefit ingroup members could be associated with reputational consequences and preferential treatment from ingroup members. However, members with self-sacrificing prosociality for their group members and harm the outgroup may not expect tangible and symbolic gains for themselves. A number of Japanese Kamikaze pilots of World War II who volunteered wittingly (Hafez, 2007) did not expect afterlife rewards (Kruglanski et al., 2014). The findings imply that, these individuals may have willingly sacrificed their lives to aggress against outgroups rather than acquire personal benefits, thus limiting the applicability of the theory of parochial cooperation to explain these instances.

The theory of parochial cooperation has established how members, who are motivated to expect favours from their group, would most likely make decisions to help the ingroup while harming the outgroup in intergroup contexts. However, this theory may not fully account for why members who willingly incur personal costs for the well-being of the group, may not expect reciprocity and reputation benefits for themselves and yet, become ready to incur personal costs to solely aggress against the outgroup without instrumental ingroup benefit rather than continue to enhance the well-being of the ingroup and harm the outgroup.

2.2.2. The Theory of Bounded Generalized Reciprocity

Grounded in an evolutionary logic to understand cooperation, the theory of bounded generalized reciprocity (Yamagishi & Mifune, 2009) propose that members in a group can mutually benefit by operating in a generalized exchange network based on indirect reciprocity. In this network, individuals strive to maintain a positive reputation of themselves because people would be more willing to cooperate with others who have a cooperative standing (Balliet et al., 2014). People readily cooperate more with members of the ingroup because cooperation enhances their reputation amongst other group members, and a good reputational standing may most likely yield benefits from ingroup members. The theory assumes that the relationship between cooperative members will be sustained into the indefinite future because an act of defection may lower the likelihood of receiving potential benefits over the long term or future, if others respond to defection in kind. Mifune et al. (2010) showed that participants who were randomly grouped and exposed to a priming stimulus

that raised reciprocity expectations through monitoring of behaviours, were more cooperative by allocating more money to an ingroup member in a Dictator game. Participants in the control condition where they were not primed with monitoring contributed lower amounts of money to the ingroup. This study may imply that publicising information about ingroup-favouring contributions may boost reputation and increase cooperation, in which the most cooperative individuals may receive benefits including social status and material gains. Predicting that cognitive taxation would increase parochial altruism, De Dreu et al. (2015) showed that members who were cognitively taxed made self-sacrificial decisions to contribute to benefit the ingroup that were associated with shorter time durations and positive expectations of ingroup members to contribute to ingroup benefit, in contrast to decisions not to contribute.

In addition, the theory of bounded generalized reciprocity presumes that individuals hold expectations of receiving favourable treatment from other ingroup members (De Dreu et al., 2014). When ingroup-outgroup relations are negative or competitive, ingroup members may express inclinations of ingroup positivity such as contributions to benefit the ingroup, because they expect greater reciprocity from each other and are expected to provide similar reciprocation to other members in the ingroup, compared to outgroup members (Yamagishi & Mifune, 2009). Using Bayesian inference models, Montrey and Shultz (2019) showed that simulations of outgroup homogeneity bias increased ingroup favouritism through direct reciprocity in which individuals learnt to maximize their expected utility through personal experiences of how mutual cooperation may promote future cooperation, indicating expectations for personal interests and benefits of cooperation from ingroup members.

Yet, members who become willingly to self-sacrifice to harm outgroups without clear and direct benefits for the ingroup, may not be attracted to rewards, recognition, and favours from other members. In their Bayesian statistical analyses of ethnographically diverse field sites ranging from foragers to the fully market-integrated samples, Purzycki and Lang (2019) derived a model that indicated extreme identity fusion increased chances of sacrificing without reciprocation from ingroup members to 56%, such that highly fused individuals were willing to give up potential gains for themselves in order to allocate these gains for ingroup members who may not reciprocate these favours. Contrary to how people commonly focus on cost-benefit calculations and decide based on what maximizes their gain or utility, Ginges et al. (2011) opined that highly self-sacrificing members may not employ the traditional form of instrumental rationality to seek reciprocal exchanges and comparisons of absolute and relative losses and gains between the ingroup and outgroups, as well as for themselves.

The theory of bounded generalized reciprocity has been advocated as an explanation of cooperation between non-kin members in groups, which may potentially explain how expectations of reputation and reciprocal interdependencies in a group may impel individuals with self-sacrificial motivations to benefit the ingroup may shift toward harming outgroups. Like the theory of parochial cooperation, the theory of bounded generalized reciprocity relies on reputation and reciprocity mechanisms that may drive members to self-sacrifice to aggress against outgroups. These assumptions thus leave the question of why members who are willing to sacrifice personal resources for their group in an intragroup context would become willing to

sacrifice personal resources to solely harm outgroups without clear and direct benefits to the ingroup, after discounting reputation and reciprocity concerns.

2.2.3. Costly Self-sacrificial Aggression (CSA) framework

The conceptual model that is presented in this section aims to explain the overarching, mediational association between members with strong self-sacrificing prosociality toward one's group and the willingness to exhibit aggression directed toward outgroups, through anticipations of outgroup hostility. This conceptual model will be termed as the *Costly Self-sacrificial Aggression* (CSA) framework. It posits that individuals with strong self-sacrificing prosociality toward their group in intragroup contexts would cognize heightened anticipations of outgroup hostility that would potentiate high willingness to self-sacrifice to aggress against outgroups relative to solely increase instrumental ingroup welfare in intergroup contexts (see Figure 1). However, this observation does not indicate that positive discrimination toward the ingroup is completely absent. Highly self-sacrificing individuals may be less inclined toward ingroup benefit because such gains may not tangibly remove the potential threat from the outgroup. This thesis puts forward that in intergroup contexts, the significance and pursuit of ingroup positivity could be *reduced* relative to the motive of outgroup harm. In line with the CSA framework, self-sacrificing individuals may strongly anticipate outgroup hostility and would be more likely to aggress against the outgroup than solely engage in ingroup benefit actions.

Compared to the theory of parochial cooperation, this framework adds further explanatory nuances to distinguish how highly self-sacrificing

individuals who are motivated to incur personal costs that would provide tangible and direct, ingroup-favouring outcomes may instead, develop the willingness to self-sacrifice to harm the outgroup rather than only attaining clear, instrumental benefits for the well-being of the ingroup. In contrast to the bounded generalized reciprocity which assumes members expect cooperation from one another which may concern their reputations, the construct of self-sacrificing prosociality that is employed in this framework, excludes assumptions of reputational and reciprocity. In the CSA framework, highly self-sacrificing individuals are presumed to be motivated to enhance and protect the welfare of their group without expectations and favours in return. In addition, it emphasizes the need to consider manifold levels of analysis and systems starting from the intra-individual level to the between-group level, so as to understand the complexities of intergroup conflicts.

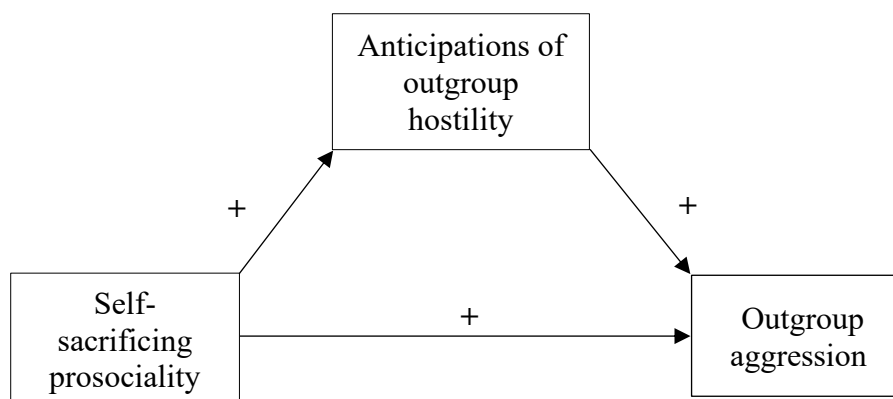


Figure 1. Proposed Costly Self-sacrificial Aggression (CSA) framework which outlines the association from self-sacrificing prosociality in intragroup contexts to aggression toward outgroups in intergroup contexts mediated through anticipations of outgroup hostility.

2.2.3.1. Explaining the association from Self-sacrificing prosociality to

Anticipations of outgroup hostility

This section will discuss the association between self-sacrificing prosociality – anticipations of outgroup hostility as well as individual differences that may strengthen or weaken this association. Individuals with strong commitment toward the group may tend to become self-sacrificial to protect the group members from potential dangers. The readiness for self-sacrifice, as conceptualised by Bélanger et al. (2014), refers to one’s willingness to fight, suffer, and even die for a cause that transcends all other life domains. This construct will be utilized as a proxy measure for self-sacrificing prosociality in the studies that will be presented in Chapters 6 to 8. Unrelated to different forms of psychopathy, the readiness for self-sacrifice may include life-endangering, altruistic behaviours by highly committed members like soldiers, firefighters, social activists to suicide bombers whose ultimate goal is predominantly to safeguard the group and its well-being (Bélanger et al., 2014). In a study that surveyed the most committed and radical members of the Liberation Tigers of Tamil Eelam (LTTE) which had been flagged as a terrorist organisation by 32 countries, Bélanger et al. (2014) found that readiness for self-sacrifice was unrelated to the duration of prison detention, but had positively predicted endorsement to engage in armed struggle and warfare to create a separate state for Tamil people in Sri Lanka. In addition, the readiness to self-sacrifice has been put forward as being situationally induced (Bélanger et al., 2018). Specific group situations and contexts may galvanize highly self-sacrificing members to anticipate outgroup harm, which may shift self-

sacrificial readiness to solely enhance the welfare of the ingroup toward harming the outgroups without clear, instrumental benefits for the ingroup.

Hypothesis 1: *Self-sacrificing prosociality towards one's ingroup in intragroup contexts will be positively associated with aggression toward outgroups in intergroup contexts.*

In intergroup context where even superficial cues of presence, intent, and actions of the outgroup is made salient, highly self-sacrificing individuals may perceive the outgroup and its presence as well as its actions as a threat to the ingroup. The precautionary perception of the outgroup as a threat could be accompanied by the view that the outgroup might hold deliberate hostile intent toward the ingroup. Individuals with high self-sacrificing prosociality may form anticipations about hostility from the outgroup such that the outgroup would most likely cause hurt to the ingroup under any circumstances. Upon the detection of a potential threat to the group, highly self-sacrificing members may become willing to incur personal costs, so as to attack the threat source and reduce its impact. The individual differences that may plausibly strengthen or weaken the association between sacrificing prosociality in intragroup contexts to anticipations of outgroup hostility in intergroup contexts, and influence the relationship between sacrificing prosociality in intragroup contexts to aggression directed toward outgroup in intergroup contexts are as follows.

Identity fusion. An individual difference that could increase self-sacrificing prosociality could be identity fusion. Members who are strongly fused with their group and regard this entity as kin, could be predisposed to take

responsibility in protecting the group and consequently become willing to make extreme sacrifices for the group when threats are perceived (Swann et al., 2010; 2012). When a potential outgroup threat is sensed, these members may then readily volunteer themselves to aggress against the outgroup than solely benefit ingroup welfare (Swann et al., 2010; 2014). Chapters 3, 6 and 7 will demonstrate and discuss the relationship between identity fusion and self-sacrificing prosociality.

Hypothesis 2: *Self-sacrificing prosociality towards one's ingroup will mediate the relationship between identity fusion in intragroup contexts and aggression toward outgroups in intergroup contexts.*

Retributive mindsets. Revenge-based thinking is aimed at returning the inflicted harm on those who have, or are perceived to have, inflicted harm on the ingroup (Jackson et al., 2019; Lickel, 2012). In an intergroup context, highly self-sacrificing members may perceive the outgroup as a potential danger that may engage in malicious intent and action directed toward the ingroup. Individuals with retributive thinking may be motivated to pay back the harm, which would be viewed as unjustified, in return for the potential harm from the hostile outgroup, resulting in defensive aggression to prevent harm. Chapter 4 will discuss the moderating role of retributive mindsets in the relationship between self-sacrificing prosociality and aggression directed toward the outgroup.

Social identity complexity. An individual difference that may reduce the effect of identity fusion on self-sacrificing prosociality is social identity

complexity. Individuals with high social identity complexity have been found to be more appreciative of their complex, multiple ingroup memberships and recognize the distinctiveness of these social categories, compared to individuals with low social identity who consider strong interrelations among their identities that can be coalesced into a single ingroup representation (Roccas & Brewer, 2002). When high social identity complexity is activated, highly self-sacrificing members may become less willing to incur personal costs for their ingroup and may cognize the outgroup more positively, which could reduce the inclination to support and engage in outgroup aggression. Chapter 7 will discuss the role of social identity complexity in weakening one's readiness to self-sacrifice for a group.

2.2.3.2. Explaining the association from Anticipations of outgroup hostility to Outgroup aggression

This section will discuss the association between anticipations of outgroup hostility – outgroup aggression as well as how perceived outgroup threat in an intergroup context may influence this association. In an intergroup context, members who are highly self-sacrificing toward their group would possess a high level of sensitivity to potential outgroup threats. Anticipating the outgroup as a threat, highly self-sacrificing members would readily volunteer to aggress against the outgroup over solely seeking to provide instrumental benefits to the ingroup. Attributing the motive of outgroup hate to actions of the outgroup could be underpinned by hostile attribution bias.

Described as the tendency to make inferences and ascribe hostile meaning to others' behaviours in ambiguous situations (Borum, 2014), hostile attribution

bias could activate the aggressive script which may increase the probability of inflicting aggression as the behavioural intention and reaction (Gagnon et al., 2016). Hypervigilant in scanning threats for the ingroup, highly self-sacrificing members could likely conceive outgroup-specific threat appraisals in an intergroup context. These self-sacrificing members may subsequently be inclined to incapacitate and terminate the threatening outgroup by aggressing pre-emptively, contrary to solely increasing instrumental benefits for the welfare of the ingroup. Such evaluations may propel them to be most eager to remove the threat by harming the outgroup. When high threat from the outgroup is overtly present, most group members, without strong self-sacrificing prosociality and anticipations of outgroup hostility, may expectedly seek to aggress against the outgroup.

However, to members with strong self-sacrificing prosociality, perceived or implied threats from an outgroup may be treated similarly as actual and explicit acts of harm from the outgroup. When threat from the outgroup is ambiguous, high self-sacrificing members may thus become highly sensitive to such threat cues and may be wary of the presence, intent, and actions of the outgroup. They may assume external negative stimuli and cues from the outgroup as possible risks and vulnerability for the ingroup's welfare (Neuberg & Schaller, 2015). Anticipating hostility and antagonism from the outgroup, they may tend to instinctively construe any ambiguous cue or action from the outgroup the presence of an outgroup that is not tangibly threatening, as a danger to the ingroup. Under ambiguous outgroup threat situations, such members would willingly sacrifice their individual resources to readily shoulder extreme risk to harm the outgroup than to solely and directly enhance

instrumental ingroup well-being. On the contrary, when the outgroup does not pose as a direct threat to the ingroup (i.e., outgroup threat is clearly absent), self-sacrificing prosociality may not directly generate anticipations of outgroup hostility. Instead, self-sacrificing prosociality may lead to increased outgroup harm, among those with strong anticipations of outgroup hostility.

Hypothesis 3: *Anticipations of hostility from the outgroup will mediate the relationship between self-sacrificing prosociality towards one's ingroup in intragroup contexts and aggression toward outgroups in intergroup contexts.*

Perceived salience of intergroup threats. The extant empirical research has evidenced support for the primacy of ingroup positivity in the presence of actual threat from outgroups in intergroup contexts (Hudson et al., 2019; Scott et al., 2017; Vezzali et al., 2016). Examining how perceptions of economic prosperity may affect attitudes toward immigrants among Australian residents, Jetten et al. (2015) found that perceived fear, rather than an actual threat, of losing future wealth of Australia was found to mediate the association between collective gratification which concerned satisfaction toward the current wealth of Australia and strong support to oppose immigration that may endanger the lifestyles of Australians. Even in the absence of an intergroup conflict that may involve realistic competition for scarce resources and incompatible goals, anticipations of outgroup hostility or outgroup-specific threat appraisals may likely necessitate self-sacrificial behaviours to harm and eliminate the outgroup as opposed to solely increasing the instrumental benefits for the well-being of the ingroup, which may not guarantee the group is safe from the outgroup

(Jonas et al., 2014; Neuberg & Schaller, 2015). Chapters 4 to 6 will discuss the roles of outgroup threat severity and group-level contexts on the relationship between self-sacrificing prosociality and aggression directed toward the outgroup.

2.2.4. Theoretical perspectives grounded in the Identity Fusion Theory

The theoretical framework in this project will entail perspectives from the *identity fusion theory* (Swann et al., 2010) that may provide explanatory support for the proposed CSA framework on the positive relationship between self-sacrificing prosociality in intragroup contexts and outgroup aggression in intergroup contexts.

Described as engendering visceral feelings of shared essence with the group and its composite members, the theory of identity fusion has been robustly linked to extreme social bonding and self-sacrifice (Swann et al., 2009; Swann et al., 2012). Identity fusion is a specific form of tight group alignment whereby the permeable boundary between the social and personal selves enables group members to regard one another not as co-operators, but as psychological kin and unique individuals (Swann et al., 2014). Unlike social identity theory that emphasizes depersonalisation (Tajfel & Turner, 1979), the *identity-synergy* tenet of the identity fusion theory presumes that, not only does activating the social self triggers the personal self and yields pro-group outcomes, activating the personal self would likewise synergistically galvanise the social self and motivate pro-group actions (Gómez et al., 2011). Furthermore, the *agentic personal-self principle* submits that the personal self is capable of investing and channelling personal agency into pro-group

behaviours, such that highly fused members may feel personally responsible to initiate and take actions to defend their ingroup and be willing to make extreme self-sacrifices against the outgroup (Gómez et al., 2011). In the *relational-ties principle*, highly fused persons view individual members of the group as well as the wider, abstract collective as family, which makes them inclined to endorse self-sacrifice for individual ingroup members who might be familiar or anonymous in small-knit groups and large-scale communities (Gómez et al., 2011).

Theoretically, fusion refers to a porous boundary between personal and group identities. As both the personal and social selves can energise pro-group behaviours, fused individuals are in a position to engage in more extreme pro-group behaviours and make ultimate sacrifices such as to forgo their families, wealth, and lives (Sheikh et al., 2014; Swann et al., 2014b). This proactivity among high self-sacrificing members can be explicated by extreme family-like commitment which binds non-genetic strangers in small groups and large collectives to voluntarily sacrifice for one another. Likewise, fusion has shown to predict extreme group violence, indicative of its associative strength with outgroup aggression (Swann et al., 2014a; Whitehouse et al., 2014).

Highly fused members who are protective of their kin-like group members, would be naturally responsive to superficial cues that are diagnostic of potential vulnerability to dangers. Such precaution to detect potential threats would be especially warranted in intergroup contexts when encountering members of outgroups. Highly fused members could perceive greater threat bias and vigilance against outgroup members across situations with real or imagined threat. High fusion could prompt anticipations of potential aggression

from the outgroup that facilitate harsh actions to ensure the protection of their group members who could be vulnerable to the threat. Producing the potential for cohesive and resilient groups that contain individuals willing to participate and contribute at extreme levels (Atran, 2016; Fredman et al., 2015), these principles collectively could insinuate how highly self-sacrificing members may have a strong preference for combative means and outcomes toward the outgroup. Such rationalisations may portray self-sacrificing prosociality as a strategic reason and rational calculation to conduct outgroup aggression.

Taken together, the principles of the identity fusion theory, that supports the proposed CSA framework, attempt to explain why highly self-sacrificing members who seek to protect members of their group and possess hypervigilance to potential threats may develop anticipations of outgroup hostility in intergroup contexts, even when there is no clear danger from the outgroup directed to the ingroup. Consequently, their anticipations of outgroup hostility may drive self-sacrificial motivations for instrumental ingroup benefit to transition to self-sacrificial motivations for outgroup harm so as to protect the ingroup and its members.

2.2.4.1. Comparison of similarities, differences, and empirical predictions

among the CSA framework, Parochial Altruism Theory, and Bounded Generalized Reciprocity Theory

Overall, the parochial altruism theory, bounded generalized reciprocity theory, and the CSA framework in this thesis share a number of similarities and differences in terms of assumptions and outcomes. The major similarity among the parochial altruism theory, the bounded generalized reciprocity theory, and

the CSA framework is that members in a group may foster intrapersonal relations with one another. The parochial altruism and bounded generalized reciprocity theories assume members build and maintain their positive reputations by helping fellow members (Romano et al., 2017). Similarly, the CSA framework proposes that members who develop a sense of fusion with their group, would identify with every other group member as strong relational bonds are fostered (Gómez et al., 2011). Of secondary importance is the similarity based on the presumption that members in a group are primarily guided by motives of ingroup bias and become willing to self-sacrifice to benefit and protect the group in intra- and intergroup conflicts (Balliet et al., 2014; Bernhard et al., 2006). Likewise, the CSA framework proposes that motivations of ingroup positivity dominantly govern the decisions and actions of members who willingly self-sacrifice in intergroup conflicts.

However, the CSA framework differs from the parochial altruism theory and the bounded generalized reciprocity theory. While the parochial altruism theory predicts that during intergroup conflicts, members prefer outcomes that help the ingroup and simultaneously harm the outgroup, the bounded generalized reciprocity theory assumes that even under intergroup contexts, members cooperate to provide benefits only to the group in absolute terms. The bounded generalized reciprocity theory predicts that only ingroup cooperation will occur in intergroup settings and hence, does not explain the emergence of outgroup aggression. Following this line of reasoning, the parochial altruism and bounded generalized reciprocity theories may not explain how highly self-sacrificing members may become willing to engage in radical expressions of self-sacrifice where benefits to the ingroup and to themselves are minimal or

close to nil. While there might be a paucity of studies on extremely costly self-sacrifice that are underpinned by parochial altruism and bounded generalized reciprocity theories, indirect evidence from the male warrior hypothesis could be employed to show that members readily risk their lives to maximize material goods like for themselves and the group (Diekhof et al., 2014). In contrast to the two theories, the CSA framework proposes that members may be more prone toward harming the outgroup over benefitting the instrumental welfare of the ingroup during intergroup conflicts. Unlike the parochial altruism and bounded generalized reciprocity theories which emphasize on reaping tangible ingroup gains, the CSA framework postulates that highly self-sacrificing members desire to protect the group from threats and would become willing to bear extreme costs to themselves, even when personal costs considerably exceed gains for the ingroup.

A minor yet related difference would be that both the parochial altruism and bounded generalized reciprocity theories assert that members build and maintain positive reputations of themselves to acquire mutual benefits and avoid being excluded from the group which can hinder future exchanges. However, the CSA framework puts forth that members who are willing to cooperate and incur costs for the group may not be fixated on establishing their reputations as reliable cooperators because ingroup well-being is perceived to be of greater importance than their self-images in competitive intergroup contexts. Lastly, the parochial altruism and bounded generalized reciprocity theories hypothesize that members cooperate because they trust ingroup members who received benefits would reciprocate the favour at some point. Yet, the CSA framework proposes that members who readily self-sacrifice for

the group may not expect reciprocity as they seek to protect the group from threats during intergroup conflicts rather than maximize their personal gains.

Table 1 summarizes the similarities and differences among the CSA framework, parochial altruism theory, and bounded generalized reciprocity theory.

Table 1

Key similarity and difference among the CSA framework, parochial altruism theory, and bounded generalized reciprocity theory.

	CSA framework	Parochial altruism theory (De Dreu et al., 2014)	Bounded generalized reciprocity theory (Yamagishi & Kiyonari, 2000)
Predicted major similarity	Members establish intrapersonal bonds with one another, which motivates them to readily self-sacrifice for the ingroup.		
Predicted major difference	In intergroup contexts, highly self-sacrificing members are expected to be strongly inclined	In intergroup contexts, highly self-sacrificing members are expected to be strongly orientated toward parochial altruism	In intergroup contexts, highly self-sacrificing members are expected to be strongly orientated

toward outgroup harm.	(i.e., ingroup benefit and outgroup harm).	toward ingroup benefit.
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Consistent with the major difference on outcomes, the three paradigms may postulate varying predictions about the dominant behaviours of highly self-sacrificing members during intergroup conflicts. The parochial altruism theory would predict that members who are highly self-sacrificing would allocate their personal resources to chiefly maximize intergroup differences by simultaneously helping the ingroup and hurting the outgroup relative to solely bolstering ingroup welfare or harming the outgroup. The bounded generalized reciprocity theory would expect that members who are highly self-sacrificing would allocate their personal resources to increase ingroup welfare in absolute terms. However, the CSA framework would hypothesize that members who are highly self-sacrificing would allocate their personal resources to harm the outgroup relative to enhance ingroup welfare. These three predictions will be compared and discussed as ancillary hypotheses in Chapters 3 to 8.

2.3. Methodological approach

Behavioural economic games serve as useful experimental apparatuses that reveal strategic motives and preferences that govern human decision-making and behaviour in social interactions. Adaptable to different social issues involving individuals, ingroups, and outgroups, the simple design of behavioural economic games can embed psychological manipulations to distinctly tease apart how people may devise dominant strategies and make incentive-maximizing decisions concerning resource allocation (Everett et al.,

2015). Behavioural economic games presume that players are fully cognizant of the outcomes and consequences of their decisions (Burton-Chellew & West, 2012).

Conceptually, the behavioural economic game methodologies were adopted as a tool to simulate the psychological processes of interest in this thesis, such as self-sacrifice, outgroup threat, and outgroup harm, in minimal group contexts that involved real stakes like money and actual physical harm. Theoretically, these methodologies could be utilized to compare and measure the empirical predictions of the alternative explanations (i.e., parochial altruism and bounded generalized reciprocity models) against the proposed CSA framework to show how motives and behavioural preferences of highly self-sacrificing members differ from their counterparts under intragroup cooperation and intergroup conflict.

Behavioural economic games emphasize on tight control of variables which limits ecological validity, but its designs could precisely specify processes and draw inferences without the effects of potential external confounds (Everett et al., 2015). However, observational studies may involve unmeasurable environmental confounds that may have an effect on self-sacrificing prosociality and its underlying motives. Pen-and-paper surveys may not create realistic, intra- and intergroup-centric impressions for participants. In Studies 1 to 3, participants were assigned to a role of a group member, matched to outgroups that pose various levels of threat, and decide on outcomes involving real stakes for oneself and others like physical harm and money. The use of self-report questionnaires or observational studies to assess self-sacrificing prosociality may require notions of real group causes and identities.

Studies 4 and 5 used national identity and self-report questionnaires relating to the U.S.

Thus, the use of behavioural economic game methodology was not aimed at testing hypotheses pertaining to gametic approaches but were harnessed to study the proposed relationship between self-sacrificing prosociality and outgroup aggression in a minimal group decision-making context with real stakes (actual gains/losses for self and others). Two decision-making games which have been widely employed - Volunteer's dilemma game and the Intergroup Prisoner's dilemma – Maximizing differences game - were utilized in the studies of this thesis that are discussed in the next sections.”

2.3.1. Volunteer's dilemma game

In 1347, Edward III, the king of England, proposed to spare a siege against the city of Calais if only six burghers were willing to offer themselves as hostages to be hanged (Krueger, 2018). Eventually, a group of citizen volunteers came forward to surrender their lives to the king. This example illustrates a Volunteer's dilemma. This dilemma first begins with a requirement that an individual member in the group would need to volunteer and make a personally-costly contribution that would provide a benefit to all other group members. All members in the group may avoid from volunteering to bear any personal costs and instead, free-ride on the contributions of others (Krueger, 2016). When all members choose not to volunteer, everyone in the group will suffer similar consequences. In contrast, a member who chooses to volunteer, will be the only player to incur the cost for him/herself while the costs for other members will be averted.

The Volunteer's dilemma game methodology could be used to specifically measure one's willingness to pay a cost to maximize rewards for the group or oneself, which could determine the magnitude of their motivations toward ensuring personal gain or group cooperation and welfare. This game hence may serve as a suitable measure to assess self-sacrificing prosociality of individual members in a group and identify self-sacrificing members from non-volunteers. Members who might be less self-sacrificing toward the group may refrain from volunteering and maximize personal payoffs at the expense of other group members. Conversely, self-sacrificing members could be more cooperative and may willingly incur personal loss to enhance group payoffs, irrespective of the outcome for oneself. There could be alternative motives to either volunteer or refrain in the game, which could be identified by incorporating questions for players to indicate the underlying motives of their decisions to volunteer or refrain at the end of the game round(s). These motives may reveal bystander expectations where the player may hold different likelihoods of other members volunteering. Highly self-sacrificing members are assumed to be proactive and not expect other members to volunteer to benefit ingroup welfare, thus controlling for the effects of these expectations could derive a more accurate measurement of self-sacrificing prosociality. Experimentally, this methodology may include how manipulations and control conditions in which participants are exposed to different costs, payoffs, and incentives for oneself, fellow members, and the collective group, could affect self-sacrificing prosociality. Prior intragroup decision-making studies have employed variants of the Volunteer's dilemma game to investigate the relationship between the willingness of members to make costly sacrifices and

ingroup cooperation, trust, and solidarity (Archetti, 2011; Hillenbrand & Winter, 2018; Olivola et al., 2017). Studies by Archetti (2009) and Archetti and Scheuring (2011) showed that, in the Volunteer's dilemma games, large group sizes and volunteering costs were associated with low volunteering rate, and that repeated games may involve greater reciprocation and reputation effects than one-shot games.

2.3.2. Intergroup Prisoner's dilemma – Maximizing differences game

There are a number of commonly used economic games to study and measure prosocial and cooperative decisions in intergroup interactions with the ingroup and outgroup (Everett et al., 2015). Developed by Halevy et al. (2008), the Intergroup Prisoner's dilemma – Maximizing differences game was designed specifically to distinguish different strategies that may emerge during an intergroup competition namely, ingroup benefit, parochial altruism, outgroup harm, and personal gain through defection by measuring how much group members contribute to each outcome. The game involves an ingroup and an outgroup where each group member is given the same monetary or points endowment and has to decide how much of the endowment to contribute. The contributions can be kept for oneself which represents a self-serving motive (Self pool), and/or be made at a personal cost to both or either of two pools that benefits the ingroup without affecting the outgroup which represents a cooperative motive (Within-group pool) and another pool that simultaneously benefits the ingroup while harming the outgroup which represents a competitive, parochial altruistic motive (Between-group pool). Every one-point or one-dollar contribution to either the Within-group pool or the Between-group

will ensure that the relative difference between the two pools will be maintained equally. This arrangement would allow the dominant motive to be determined distinctly. Laboratory aggression paradigms that seek to inflict ostensible physical harm or discomfort like the hot sauce measure (Lieberman et al., 1999), noise blasts (Ferguson & Rueda, 2009), and yoga poses (Finkel et al., 2009) could be incorporated into the game in accordance to different study designs and hypotheses that compare the levels of motives and contributions toward the ingroup, outgroup, and oneself. By introducing a competitive, intergroup climate, the Intergroup Prisoner's dilemma – Maximizing differences methodology allows the game structure to include manipulations like the severity of outgroup threat, characteristics of the outgroup, and the number of ingroup members who are targeted by the outgroup. Such experimental designs demonstrate how the cooperative motivation to benefit the ingroup may differ from the aggressive motivation to hurt the outgroup.

In this thesis, the Volunteer's dilemma and Intergroup Prisoner's dilemma – Maximizing differences game methodologies have been adapted and employed to model, test, and analyse the association from self-sacrificing prosociality in intragroup contexts to outgroup aggression in intergroup contexts, through anticipations of outgroup hostility. The Volunteer's dilemma game is used to measure self-sacrificing prosociality in intragroup contexts while the Intergroup Prisoner's dilemma – Maximizing differences game is utilised to measure anticipations of outgroup hostility and outgroup aggression in intergroup contexts. Thus, the two methodologies enable a meticulous examination of the proposed causal mechanisms in this thesis.

2.4. Novel contributions

This thesis makes five novel contributions. First, a measure based on ingroup benefit, ingroup defence (similar to parochial altruism to defend against the outgroup), and outgroup harm in the context of allocating funds to policy programs was constructed for the purpose of the studies in this thesis.

Adaptable to different contexts and types of groups, this scale demonstrated adequate reliability across three experiments (Studies 4 to 6) and could serve as an exploratory tool for measuring the dominant option and relative differences among the different decisions toward ingroups and outgroups.

Second, the findings provide the first experimental evidence that illustrate the context-contingent mechanism of anticipated outgroup hostility which emerged for highly self-sacrificing members compared to their counterparts. Anticipating outgroup hostility, when there is an absence or ambiguous indication of outgroup threat, could function as a situation-sensitive heuristic that exhort highly self-sacrificing members to make decisions to inflict harm outgroup than benefit the ingroup. In contrast, past research examining individual sacrificial behaviours in intergroup contexts found that individuals were willing to contribute personal resources to aggress against outgroup members under situations of high threat from the outgroup (Halevy et al., 2010; Weisel, 2016).

Third, the role of cognitive processes in extremist intent and behaviours has received scant attention (Zmigrod et al., 2018). Although the studies did not directly examine members of extremist groups, this research furthers the understanding of cognitive determinants and processes that relate to self-sacrificing prosociality (Belanger et al., 2014), and how these associations may

produce aggressive actions toward hypothetical and actual outgroups like terror organizations, that are appraised as extreme pro-group behaviours in real-world settings. The findings in this thesis may present potential insights into the initial judgement and decision-making processes of highly fused and self-sacrificing individuals, such as constant hypersensitivity toward threat-connotating cues and anticipations of potential hostility from outgroups. Understanding these processes could be applied to discern individuals who could be at risk of early-stage, violent extremist thinking and actions.

Fourth, besides demonstrating increased anticipations of outgroup hostility and its effect on outgroup aggression, this research showed that the mechanism of anticipated outgroup hostility could be weakened through the activation of high social identity complexity. Increased awareness of multiple ingroup memberships, or high social identity complexity, could be incorporated into interventions on building positive intergroup relations, to reverse the downstream effects of self-sacrificial readiness for a specific ingroup, anticipations of outgroup hostility, as well as intentions and actions of outgroup aggression. To highly fused and self-sacrificing individuals who may anticipate potential outgroup hostility, social identity complexity may induce favourable perceptions toward outgroups and the unlearning and un-hardening of inflexible, negative opinions toward outgroups.

Fifth, the studies in this research incorporated perceptions and contexts of different levels of analysis from the individual member to intragroup and intergroup. In light of prior literature which argued for the influence of perceptions of intragroup positivity on the significance and potency of intergroup threats, the findings showed that highly self-sacrificing members

who desire to protect their ingroup in intragroup contexts were more likely to anticipate outgroup hostility and pre-emptively harm outgroups in intergroup contexts. Intergroup conflict researchers have emphasized the need to study how dynamics at each level affect one another which may have important consequences for understanding intergroup conflicts as well as the psychology of self-sacrifice in intra- and intergroup contexts (Dovidio et al., 2009; Lanman et al., 2018). Compared to extant studies that largely focus on between-group contexts, our research could offer a more meticulous and ecologically valid assessment on “how ingroup love may become outgroup hate” (Brewer, 2001).

2.5. Major hypotheses

This thesis aimed to identify the enabling factors and processes that determine whether members with high self-sacrificing prosociality would prioritize harming potentially competing and threatening outgroups relative to solely boosting the welfare the ingroup. The proposed positive relationship between self-sacrificing prosociality and aggression towards outgroups can be influenced by a host of individual predispositions like identity fusion and retaliatory thinking, as well as situational constraints like outgroup threat severity and intergroup competition over rewards. The following three hypotheses will be tested in the studies presented in Chapters 3 to 5:

Hypothesis 1: *Self-sacrificing prosociality towards one’s ingroup in intragroup contexts will be positively associated with aggression towards the outgroup in intergroup contexts.*

Hypothesis 2: *Self-sacrificing prosociality towards one's ingroup will mediate the relationship between identity fusion in intragroup contexts and aggression towards the outgroup in intergroup contexts.*

Hypothesis 3: *Anticipations of hostility from the outgroup will mediate the relationship between self-sacrificing prosociality towards one's ingroup in intragroup contexts and aggression towards the outgroup in intergroup contexts.*

Figure 2 presents a theoretical model that extends Figure 1 to encompass the major hypotheses and supporting hypotheses examined in each data chapter. The major hypotheses 1 and 2 were tested in Study 1. From Figure 2, retributive mindsets that comprised of vengeance and retributive justice orientations were tested for moderating effects between self-sacrificing prosociality and outgroup aggression in Study 2. Study 4 examined the mediating roles of self-sacrificial readiness and anticipated outgroup hostility through identity fusion and outgroup harm, with vengeance as a moderator. Appraisals of outgroup harm as concern for ingroup welfare was predicted to mediate the relationship between anticipations of outgroup hostility and outgroup aggression in Study 5. The hypothesized model in Study 6 investigated whether the relationship between self-sacrificing prosociality and outgroup aggression could be reversed, which differed from the variables displayed in Figure 2.

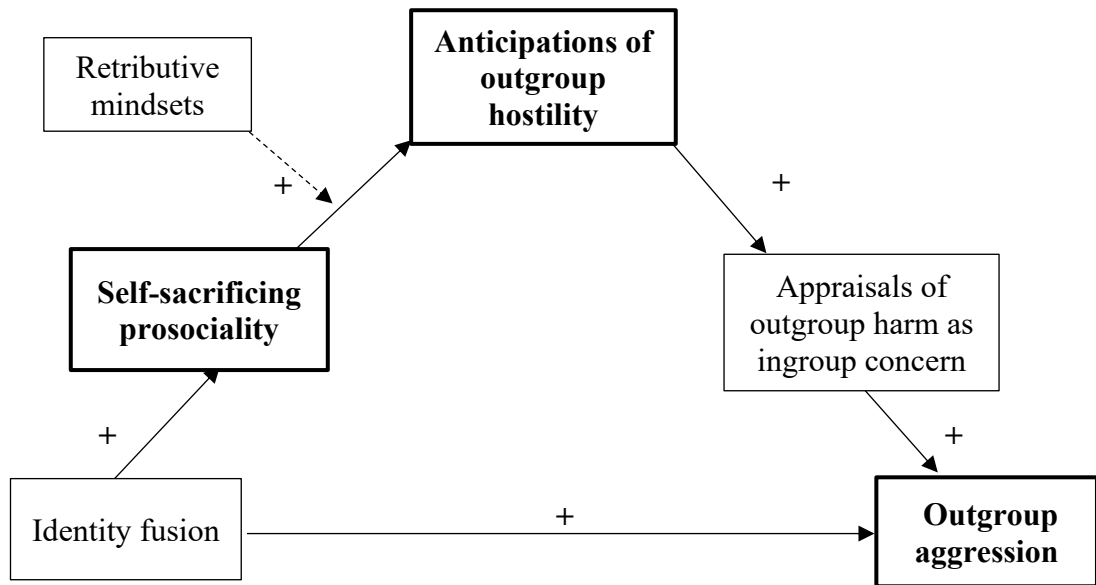


Figure 2. A theoretical model displaying the hypotheses examined in Studies 2 to 7. The text in bold represent the three variables of the CSA framework.

3. CHAPTER 3: CONDUCTING AN EXPLORATORY TEST OF THE POSITIVE ASSOCIATION BETWEEN SELF-SACRIFICING PROSOCIALITY AND OUTGROUP AGGRESSION

3.1. Establishing the positive association between self-sacrificing prosociality and outgroup harm

“...[P]eople almost never kill and die for the Cause, but for each other: for their group,....their imagined family of genetic strangers” (Atran, 2010, p. 23).

While many people carry out small sacrifices for their group members, only a few defy the survival instinct to bravely bear extreme, costly sacrifices to ensure their group is protected. Individuals who perceive a strong sense of oneness between their personal and social identities experience high levels of identity fusion. Strongly fused individuals view fellow group members with similar membership and personality characteristics as psychological kin and become willing to self-sacrifice to ensure the group is unharmed (Swann et al., 2010b).

Similarly, in intergroup settings, individuals have been shown to engage in costly cooperation to benefit the well-being of their ingroup more than to act parochially to harm the outgroup while benefitting the ingroup. However, self-sacrifice to harm the outgroup without directly and tangibly benefitting the ingroup has been identified in studies that are based on groups with arbitrary identities in economic games and social groups with real identities (Weisel & Böhm, 2015). De Dreu et al. (2015) found that, though evidence yielded from organisations that conducted hostile appropriations and battles in contemporary interstate wars emphasize that ingroup defence has been highly effective than

outgroup aggression, members with high self-sacrificing prosociality may desire to subordinate, exploit, and aggress against outgroups over seeking to benefit the ingroup. From these findings, highly committed members who are willing to self-sacrifice for the ingroup in an intragroup context, may prioritize to incur costs to harm the outgroup over only enhancing the instrumental benefits for ingroup welfare in an intergroup context.

The purpose of Study 1 was to hence investigate whether members who are highly self-sacrificing would prioritise a competitive and aggressive motive intended to harm the outgroup over a cooperative motive to benefit their ingroup members. Study 1 predicted that self-sacrificing prosociality in intragroup contexts would be positively associated with a competitive and aggressive motive intended to aggress the outgroup in intergroup contexts. In addition, Study 1 tested whether this relationship would remain consistent when taking account of different individual and group payoffs, costs, and incentives that could benefit oneself and his/her group members. In this study, self-sacrificing prosociality will be measured using an intragroup game (Volunteer's dilemma game) and motives to enhance the ingroup and/or harm the outgroup will be measured using an intergroup game (Intergroup Prisoner's dilemma – Maximizing differences game).

3.2. Study hypotheses

There were two hypotheses that were tested in Study 1. In an intragroup context, to protect their group, highly self-sacrificing members could be constantly and strongly vigilant in detecting potential dangers that could harm the group. In an intergroup context, strongly self-sacrificing members could

become willing to bear personal costs to aggress against the outgroup, which could ensure that the potential threat is mitigated and the group is protected, compared to bolstering the well-being of the ingroup.

Hypothesis 1: *Self-sacrificing prosociality towards one's ingroup in intragroup contexts will be positively associated with aggression towards the outgroup in intergroup contexts.*

Individuals who are highly fused with their ingroups regard their group members as 'fictive kin'. In an intergroup context, fused individuals who may have develop high self-sacrificing prosociality toward the group could be highly attentive to potential signals of dangers that may threaten the group and may thus perceive the outgroup as a threat. Such members may become highly willing to sacrifice themselves to aggress against the outgroup as opposed to solely enhance instrumental benefits for the welfare of the ingroup.

Hypothesis 2: *Self-sacrificing prosociality towards one's ingroup will mediate the relationship between identity fusion in intragroup contexts and aggression towards the outgroup in intergroup contexts (see Figure 3).*

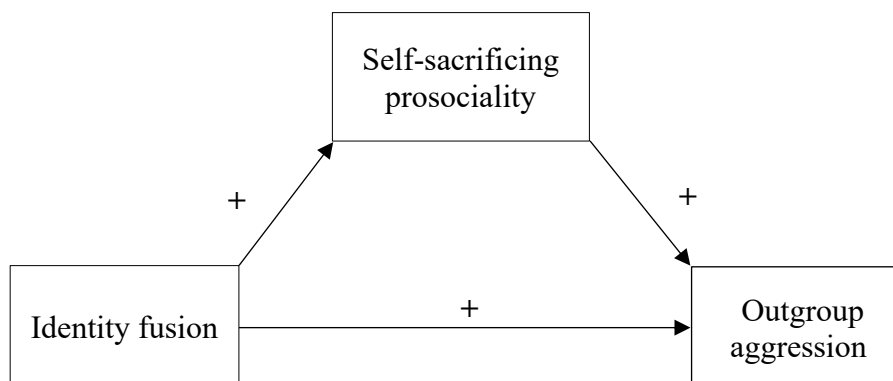


Figure 3. Identity fusion in intragroup contexts to aggression toward outgroups in intergroup contexts mediated through self-sacrificing prosociality.

3.3. Method

3.3.1. Participants

One hundred and twenty American participants (62 women, $M_{age} = 36.85$ years, $SD_{age} = 12.06$) were recruited through Amazon Mechanical Turk (MTurk) to play two decision-making games in which they could earn money based on their decisions and the decisions of other participants. An *a priori* power analysis using the G*Power program (Faul et al., 2009) indicated that, based on a linear multiple regression analysis with three predictors, a sample size of 77 participants was adequate to have 80% power to detect a medium effect size of .15 at an α -level of .05. Participants were informed that they were randomly assigned to a five-member group and each player received an endowment of 10 points that they could either contribute or keep. There was no feedback and interaction among participants. They first played the *Volunteer's dilemma* game which was of an intragroup nature, followed by the *Intergroup Prisoner's dilemma-Maximizing differences* game which was played between groups. Participants were tested on their knowledge of the game instructions and rules, prior to commencing the games.

3.3.2. Study design

A within-subjects design was employed in this experiment. All participants played seven rounds of the Volunteer's dilemma game and six rounds of the Intergroup Prisoner's dilemma-Maximizing differences game. Self-sacrificing prosociality was measured as the total number of times the participant volunteered in all rounds of the Volunteer's dilemma game. The cooperative motive to benefit their ingroup was measured by the mean number of points

each member contributed to pool A in the Intergroup Prisoner's dilemma-Maximizing differences game. The competitive motive to cause harm to the outgroup was measured as the mean number of points each member contributed to pool B in the Intergroup Prisoner's dilemma-Maximizing differences game. In both games, deception was carried out through the use of individual silhouettes which depicted the ingroup and outgroup, as well as timed, pre-determined feedback to lead participants to believe that they were playing the games with other participants in the study and their decisions were analysed in a real-time environment. Presenting pre-scripted intra- and intergroup impressions were necessary to show the behaviours exhibited by the ostensible outgroups or ingroup to participants who may follow these behaviours. Using deception in these games could elicit participants' natural responses toward conforming to the specific behavioural patterns of the ingroup and outgroup in their respective contexts.

3.3.3. Measures

Volunteer's dilemma game. The Volunteer's dilemma (VoD) is a behavioural decision-making game in which, only one member in the group has to volunteer and incur a cost that benefits the group, irrespective of other members' decisions (Goeree et al., 2017). When no one volunteers, all group members pay a cost. Volunteering hence indicates cooperativeness and prosociality as costs to volunteers are not refunded. Refraining to volunteer may reflect a bystander effect tendency, in which one may not volunteer due to assumptions that another group member will volunteer. As such, bystander tendencies were controlled for in this study by measuring expectations of whether other

members in the group will volunteer in each game round. This study employed seven rounds of the VoD game. Each round required the participants to choose between volunteering a portion of a 10-point personal endowment to their group or keeping the points for themselves. A group member who volunteers is the only player to lose points, while the other four group members benefit by not losing any points. If no one volunteered, all members in the group will individually lose an equal number of points.

The number of points lost for volunteering and the points that would be deducted from each member if there was no volunteer, was made to vary at three levels – three, five, and ten points. This arrangement resulted in a 3 x 3 matrix with nine cells that were utilized as nine game rounds (see Figure 4). For example, in the first cell, the number of points for volunteering was three points and the points that would be deducted from each member if there was no volunteer was three. In the ninth cell, the number of points for volunteering was ten points and the points that would be deducted from each member if there was no volunteer was ten.

From the nine game rounds, two rounds were not measured: when the cost of volunteering was three and the points that would be deducted from each member if there was no volunteer was five; when the cost of volunteering was five and the points that would be deducted from each member if there was no volunteer was three. These two rounds were omitted because both rounds were deemed *apriori* as plausibly eliciting similar levels of self-sacrificing prosociality as the round with the cost of volunteering as three points and the cost to group as three points. Participants played each round with a new

endowment of 10 points. Self-sacrificing prosociality was measured as the total number of times each player volunteered in the seven rounds.

		Cost to Self for volunteering		
		3 points	5 points	10 points
Cost to Group if no member volunteered	3 points			
	5 points			
	10 points			

Figure 4. Structure of the Volunteer’s Dilemma game matrix. Cells that are unshaded were utilized as the seven rounds and cells that are shaded in grey were omitted in this study.

Of the seven rounds, the VoD 10-3 round was selected *a priori* as a key round that closely represented self-sacrificing prosociality where one would be willing to lose all of his (or her) 10 points so as to avert a miniscule loss of three points for the other members in the group. In a study that examined willingness to support and approve for military or diplomatic strategies to save a certain number of hostage prisoners (from 1 to 100), Ginges and Atran (2011) found that participants who were willing to support for the military option required only one hostage prisoner to be rescued, while participants who supported the diplomatic option required at least 50 hostages to be rescued. Inferring from this study (Ginges & Atran, 2011), members who might be willing to give away all their points could be deontological thinkers (who follow the logic of appropriate morals and duty-bound obligations) which leads

them to become more sensitive and preventative against any loss, small or big, befalling for the ingroup, and may more likely opt for aggressing against the outgroup that can potentially harm the ingroup.

In addition to the VoD 10-3 round, there were two other rounds - VoD 3-10 round and VoD 10-10 round – that were considered for the comparison of self-sacrificing prosociality. In the VoD 3-10 round, there could be greater willingness to self-sacrifice as the low cost to self can save group members from incurring a heavy cost. However, their willingness to volunteer could be buttressed by a pro-self motive to only undertake small costs. The VoD 10-10 round involves a high cost to the self in order to prevent a large cost for group members. Compared to the VoD 10-3 round, the VoD 10-10 round may not accurately reflect the spontaneous nature of self-sacrificing prosociality. Members who volunteer in the VoD 10-10 round could be convinced to be self-sacrificial as they weigh the collective loss of 40 points (10 points for each of the four members) as being substantial than the collective loss of 12 points (3 points for each of the four members) in the VoD 10-3 round. Though the VoD 10-3 round showed unequal proportions of volunteers ($n = 25$) and non-volunteers ($n = 95$) that may affect statistical findings, similar patterns of skewedness were observed in all other six rounds. Participants were informed that the points they earned in the VoD game would be exchanged for a monetary payout, based on the rate of 50 points for USD0.10, at the end of the experiment. A round in the VoD game is displayed in Figure 5.

In this round:

The cost of volunteering is 10 points.

If no one volunteers, each player will lose 3 points.

If you volunteer, you will lose 10 points. The other players who kept their points will keep their 10 points.

If at least one person in your group volunteers 10 points, the other players who kept their points will keep their 10 points.

You will need to choose if you will VOLUNTEER or KEEP your points.

Do you choose to:

-
- VOLUNTEER** (You will lose 10 points even if another player volunteers)
 - KEEP** (You will not lose any points if another player volunteers)

Figure 5. A round from the Volunteer's dilemma game.

Expectations of other members to volunteer in the VoD game. After participants indicated their decision to volunteer or refrain in each round of the VoD game, they were asked to rate how likely their fellow members would volunteer in that round. Participants who volunteered were asked “*How likely do you think other members will volunteer?*”. For participants who refrained, they were asked “*When making my decision to keep, I assumed other players will volunteer their points*”. Both items were measured using a 7-point Likert scale ranging from 1 (*Not at all*) to 7 (*Very much*). For each round, the two items were merged into a variable that represented the expectation of other members to volunteer. The variables from all rounds were averaged to form a variable for mean expectation of other members to volunteer.

Intergroup Prisoner's dilemma-Maximizing differences game. The Intergroup Prisoner's dilemma-Maximizing differences (IPD-MD) game has been utilized as an experimental paradigm that seeks to distinguish between motivations that benefit the ingroup and harm the outgroup (Halevy et al., 2010). Participants were told that their group will play against another five-

member group. Each member has to decide how much of his/her 10 points to keep for him/herself in the Self pool (pro-self option), how much to contribute to pool A (ingroup prosociality option), or how much to contribute to pool B (ingroup prosociality and outgroup harm option).

In pool A, every one point contributed would be doubled and evenly split among the five members of one's ingroup, reflecting a cooperative group strategy intended to maximise gains of all ingroup members. Contributing to pool B would deduct one point from the opposing group members, indicating a competitive, aggressive motive intended to harm and cause a loss to the other group. This one point would be evenly shared among the five members of the ingroup. Notably, the effect of contributing to pools A and B on the relative difference in status of points between the ingroup and outgroup are identical: each point contributed to pool A or pool B leads to a 2-point relative difference between the ingroup and outgroup. However, this identical outcome is achieved by either exclusive ingroup prosociality (pool A) or producing losses for the outgroup to fuel a gain for the ingroup (pool B). Moreover, contributions to pools A and B provide different ingroup benefit such that every one point that is contributed to pool A provides 2-point gain for the ingroup while every one point contributed to pool B provides a 1-point gain for the ingroup. In the Self pool, members could choose to contribute to neither pools A or B but to keep any amount of their 10 points for themselves, reflecting a selfish motive for personal benefit.

Participants were informed that their group will play against a new five-member group in each round. The group with the highest sum of collective points earned at the end of each round (after adding and deducting points

resulting from each participants' contributions to pools A and B), will be rewarded with additional bonus points which will be given to each member of the winning group. The bonus reward varied from 0, 10, 30, 50, 70, and 100 which were used to form all six rounds in this game. The aim of the bonus rewards was to increase the perceived competitiveness of intergroup relations in this game and to manipulate potential incentives attaining superior outcomes compared to the outgroup. In addition to the VoD game, participants were informed that the points they earned in this game would be exchanged for a monetary payout (based on the rate of 50 points for USD0.10) at the end of the experiment. Figure 6 presents a round in the IPD-MD game.

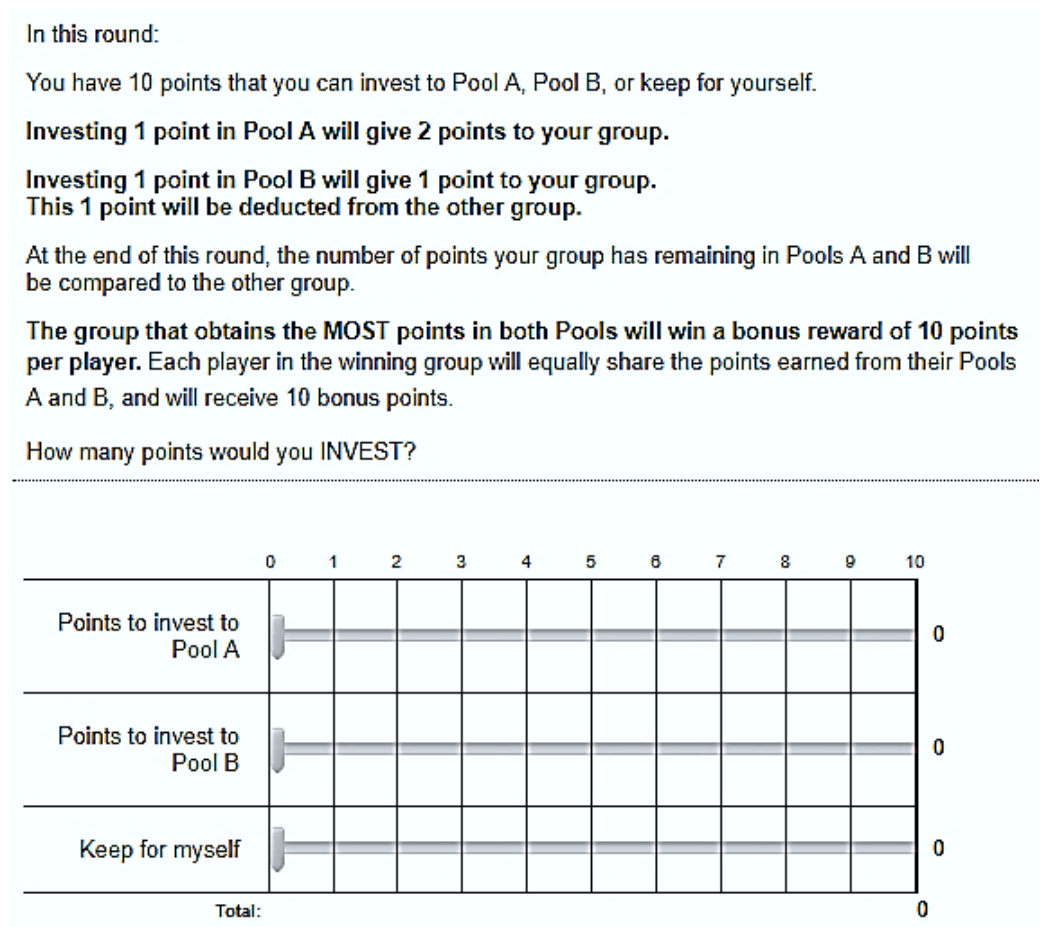


Figure 6. A round in the IPD-MD game.

Motives underlying pool contributions. After all IPD-MD game rounds were completed, participants were asked to rate two items about their motives to contribute using a 7-point Likert scale from 1 (*Not at all*) to 7 (*Very much*). The first item, “*When making my decision, I wanted to make sure my group will get more points than the other group*”, was focused on the intention to maximize intergroup difference and get ahead of the other group. The second item, “*When making my decision, I wanted to reduce the points of the other group*”, was focused on the intention to harm the outgroup. Higher scores indicated stronger motivation for the intention underlying their pool contributions.

Identity fusion. Identity fusion was measured using the Dynamic Identity Fusion Index (DIFI) developed by Swann et al. (2010) and revised by Jiménez et al. (2015). The DIFI is a digital, pictorial item formed by a small circle indicated as “Me” and a larger circle labelled as “My Group”. Participants were asked to drag the smaller circle towards the larger circle, depending on their perceptions of closeness with their group. The overlap output was used as an indicator of identity fusion, where higher distance scores indicated higher levels of identity fusion and participants perceived themselves as closely fused with their group. The possible values for distance range from *-100* (circles are separated from each other) to *125* (the smaller circle completely overlaps with the bigger circle). The DIFI has shown good criterion validity, convergent and discriminant validity, and temporal stability (Jiménez et al., 2015).

3.3.4. Procedure

Each respondent was first asked to provide his/her informed consent for their participation in the online survey. The participants were informed that they had been randomly assigned to a five-member group in which the four other participants had completed the same online survey. Participants were asked to play the VoD game where each member received an endowment of 10 points that he/she could either contribute or keep. After the VoD game, participants were told that they would play each round of the IPD-MD game with a different, five-member group comprising of other participants who had completed the same online survey and were randomly grouped. There was neither feedback nor communication within and between groups. For this study, knowledge of other members' decisions was irrelevant for the design of this study as self-sacrificing prosociality was defined as a tendency to proactively incur personal costs regardless of whether others' intentions and actions.

The Volunteer's dilemma game was thus used to distinguish between those who with low and high self-sacrificing prosociality. The IPD-MD rounds followed an one-shot game design to determine the amount of aggression inflicted on an outgroup. Participants were hence not required to know the allocations of other members in their group. Moreover, knowing other group members' decisions in both games may generate feelings and experiences of being exploited or receiving gains, which could affect self-sacrificing prosociality. Prior to making their decisions in each game, participants were presented the game instructions and rules, and were then tested on their knowledge of the game information. After completing all rounds in the two games, participants responded to the self-report scales and demographic

measures. Once they answered the measures, participants were shown a debriefing statement about the study and were asked to submit their survey completion code for payment verification.

3.4. Results

3.4.1. Manipulation checks

Participants' understanding of the VoD game rules averaged at 5.10 ($SD = .88$) and their understanding of the IPD-MD game rules averaged at 4.11 ($SD = 1.20$), on a 6-point Likert scale of 1 (*Strongly disagree*) to 6 (*Strongly agree*). The mean VoD quiz score was 3.61 ($SD = .78$), where a maximum score of 4 indicated all four questions were correctly answered. The mean IPD-MD quiz score was 2.69 ($SD = 1.10$), where a maximum score of 4 indicated all four questions were correctly answered. To assess the effectiveness of the manipulation on perceived intergroup competitiveness using increasing amounts of bonus points in the IPD-MD game, two expectations measuring how strongly participants perceived the outgroup would reduce points for the ingroup and how strongly the outgroup would want to win the bonus reward for their group were used. Across the IPD-MD game, the mean expectation about whether outgroup members would try to reduce points for the ingroup was found to be 4.82 ($SD = 1.83$), while the mean expectation about whether outgroup members would try to win the bonus reward for themselves was found to be 5.43 ($SD = 1.50$), on a 7-point Likert scale of 1 (*Strongly disagree*) to 7 (*Strongly agree*).

3.4.2. Correlations between self-sacrificing prosociality and mean pool contributions

The skewness value of totalled self-sacrificing prosociality variable was .598 which was within ± 1.00 criterion, as recommended by Meyers et al. (2013). Correlation results indicated that there were moderate associations between self-sacrificing prosociality in the VoD game and contributions to the three pools in the IPD-MD game, $r_s(120) < .34, p_s < .01$. Table 2 presents the correlations between self-sacrificing prosociality (summed across all VoD rounds) and mean contributions to pool A (ingroup benefit), pool B (ingroup benefit and outgroup aggression), and Self pool in Study 1.

Table 2

Correlation coefficients of total self-sacrificing prosociality across the VoD game and mean pool contributions in the IPD-MD game in Study 1.

	1	2	3	4
1. Self-sacrificing prosociality	1			
2. Ingroup benefit (Mean Pool A contributions)	.08	1		
3. Parochial altruism (Mean Pool B contributions)	.34***	-.09	1	
4. Mean Self pool contributions	-.26*	-.83***	-.48***	1

* $p \leq .05$, ** $p \leq .01$, *** $p \leq .001$.

3.4.3. Means comparisons of VoD and IPD-MD games

Means comparisons of volunteering rate in the VoD game. Across all rounds in the VoD game, self-sacrificing prosociality (measured as the total number of rounds participants volunteered) averaged at 2.38 times ($SD = 2.17$) out of 7 total rounds. Four VoD rounds were selected for analysis -VoD 3-3, VoD 3-10, VoD 10-3, and VoD 10-10 - which represented *cost to self for volunteering - cost to group if no member volunteered*. The VoD 5-5, VoD 5-10, VoD 10-5 rounds were excluded from the analyses as the VoD 3-5 and VoD 5-3 rounds were not measured in the game, and thus could not be compared with other rounds.

For the VoD game, a two-way, repeated-measures ANOVA was conducted to compare the effects of cost to self if volunteered and the cost to group if no member volunteered, on the willingness to volunteer. The purpose of these analyses was to provide the descriptive results of the VoD and IPD-MD games. The two expectations about whether other group members will volunteer in each game round were averaged and controlled for. There was a significant main effect for cost to self for volunteering, $F(1, 118) = 20.33, p = .04$. There was a significant main effect for cost to the group if no member volunteered, $F(1, 118) = 6.77, p = .01$. Overall, participants volunteered significantly more when the cost to self was a deduction of three points ($M = .50, SD = .04$) than when the cost to self was a deduction of 10 points ($M = .23, SD = .03$), $p < .001$. Participants volunteered significantly more when the cost to the group was a deduction of three points ($M = .42, SD = .04$) than when the cost to the group was a deduction of 10 points ($M = .32, SD = .03$), $p = .002$.

There was no significant interaction effect for cost to self for volunteering and for cost to the group if no member volunteered, $F(1, 118) = .02, p = .88$.

Means comparisons of pool contributions in the IPD-MD game. Across all rounds in the IPD-MD game, participants contributed an average of 3.77 points to pool A ($SD = 2.71$) and 2.03 points to pool B ($SD = 1.71$), and kept 4.20 points for themselves ($SD = 3.08$). For the IPD-MD game, a two-way, repeated-measures ANOVA was conducted to compare the effect of bonus reward for oneself and the group and the effect of pool type (A or B), on the amount of point contributions. The purpose of this analysis was to determine how varied amounts of incentives for oneself and the group across the IPD-MD game may affect contributions toward solely ingroup benefit as well as toward ingroup benefit and outgroup harm. The mean contributions that were kept for oneself was controlled for. There was a significant main effect for pool type (A or B), $F(1, 118) = 62.99, p < .001$. Pairwise comparisons showed that participants contributed significantly more to pool A ($M = 3.78, SD = .14$) than to pool B ($M = 2.03, SD = .14$), $p < .001$. There was no significant main effect for bonus reward, $F(5, 590) = 1.65, p = .14$. There was no significant interaction effect for pool type and for bonus reward, $F(5, 590) = 1.77, p = .12$. Pairwise comparison analyses showed that, in each bonus round, participants contributed significantly more to pool A ($M_s < 4.05, SD_s < .22$) than to pool B ($M_s < 2.34, SD_s < .20$), $p < .001$. The mean pool contributions for the six IPD-MD rounds are presented in Figure 7.

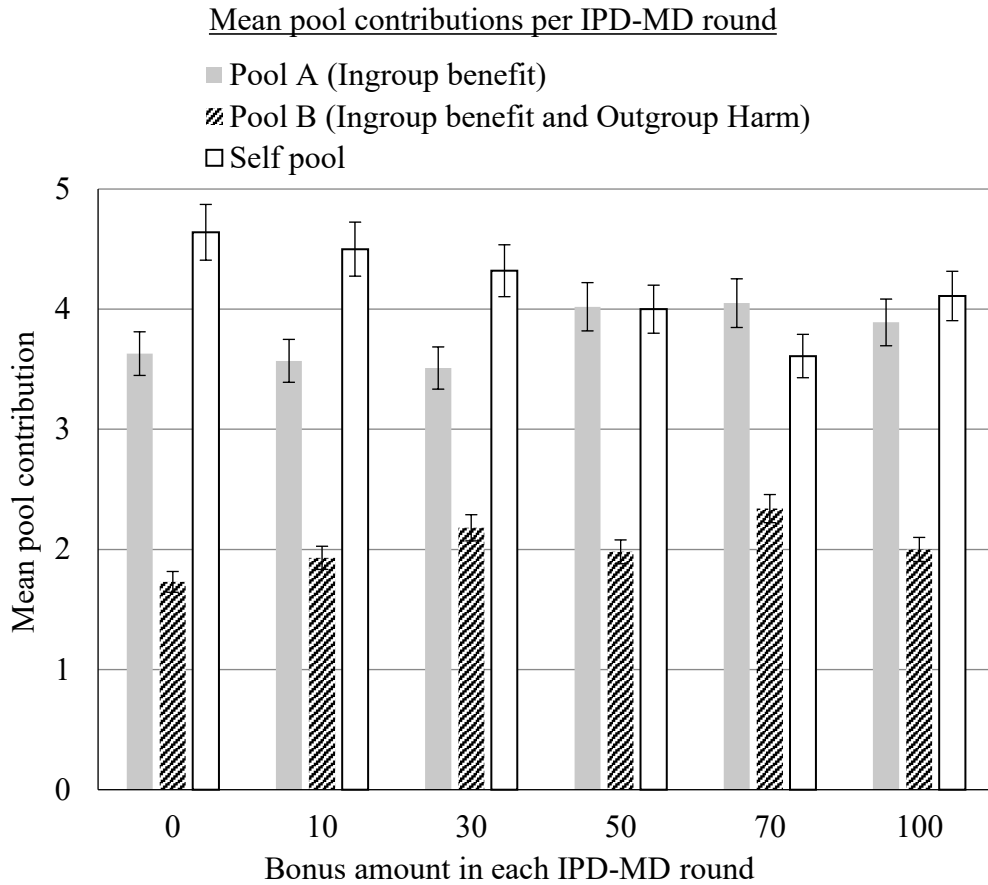


Figure 7. Mean pool contributions in each IPD-MD game round. The error bars represent standard errors.

3.4.4. Means comparisons on motives underlying pool contributions

The positive relationship between self-sacrificing prosociality and outgroup aggression could be further evidenced by the prime motives underlying the pool contributions. Members with low and high self-sacrificing prosociality could hold different motives toward their allotment decisions such as to benefit the ingroup or to harm the outgroup. To determine the motives of individuals with low and high self-sacrificing prosociality, *t*-tests were conducted using a specific VoD game round as the independent variable and two motives of pool contributions in across all rounds of the IPD-MD game as the dependent

variables. Compared to other VoD rounds, the VoD 10-3 round represented the highest degree of self-sacrificing prosociality where one would be willing to give up all 10 points in order to avert even a minor loss of three points for the other members. In this round, individuals who volunteered to lose all points were categorized as exhibiting high self-sacrificing prosociality while those who refrained were classified as displaying low self-sacrificing prosociality. Individuals with high self-sacrificing prosociality ($M = 4.76$, $SD = 1.69$) reported being more significantly motivated to reduce the points of the other group than those with low self-sacrificing prosociality ($M = 3.89$, $SD = 2.14$), $t(118) = 2.15$, $p = .037$, suggesting highly self-sacrificing members were motivated to cause harm to the outgroup, regardless of intergroup competition. There was no significance difference between individuals with high ($M = 5.48$, $SD = 1.59$) and low self-sacrificing prosociality ($M = 5.16$, $SD = 1.87$), $t(118) = .79$, $p = .43$, in the motive to increase points for their own group relative to the other group.

3.4.5. Linear regression analyses testing the effect of self-sacrificing prosociality on outgroup harm

Linear regression analyses were employed to examine Hypothesis 1 which posited whether self-sacrificing prosociality in intragroup contexts would be predictive of outgroup harm in intergroup contexts. These analyses were conducted separately using two measures of self-sacrificing prosociality selected as predictors. The first measure was the continuous variable of self-sacrificing prosociality based on the total number of times the participant volunteered in the VoD game. The second measure was the categorical variable

of self-sacrificing prosociality based on the VoD 10-3 round and was selected *a priori*. The purpose of this analysis was to establish whether self-sacrificing prosociality in intragroup contexts would predict outgroup harm in intergroup contexts in this study.

Self-sacrificing prosociality (based on all VoD rounds) and mean outgroup harm. Self-sacrificing prosociality (based on the total number of times the participant volunteered in the VoD game) was submitted as the independent variable and mean pool B contributions (based on averaged contributions for the seven IPD-MD rounds) was utilized as the dependent variable. The mean expectation that other members would contribute in the VoD game rounds was controlled for by submitting this variable as a covariate in this analysis. The overall model was significant, $R^2 = .12$, $F(2, 117) = 7.66$, $p < .001$. Supporting Hypothesis 1, self-sacrificing prosociality in intragroup contexts predicted mean pool B contributions in intergroup contexts, $\beta = .26$, $t(117) = 3.79$, $p < .001$, after controlling for the mean expectation that other members would contribute in the VoD game, $\beta = .10$, $t(117) = 1.02$, $p = .31$. Individuals who were more self-sacrificing toward their group in intragroup contexts were more inclined toward the motive to harm the outgroup (pool B) across the increasing levels of intergroup competition, as opposed to the motive to directly and solely benefit the ingroup (pool A).

Self-sacrificing prosociality (based on all VoD rounds) and outgroup harm in the absence of intergroup competition. Self-sacrificing prosociality (based on the total number of times the participant volunteered in the VoD game) was submitted as the independent variable and pool B contributions based on the IPD-MD round with the absence of intergroup competition were

utilized as the dependent variable. The mean expectation that other members would contribute in the VoD game rounds was controlled for by submitting this variable as a covariate in this analysis. The overall model was significant, $R^2 = .08$, $F(2, 117) = 5.02$, $p = .008$. Interestingly, self-sacrificing prosociality predicted pool B contributions (but not pool A) when the bonus reward was zero, $\beta = .24$, $t(117) = 2.96$, $p = .004$, after controlling for the mean expectation that other members would contribute in the VoD rounds, $\beta = .13$, $t(117) = 1.18$, $p = .24$. Individuals who were highly self-sacrificing toward their group were more inclined to harm the outgroup compared to directly benefit the ingroup, even in the absence of incentives for either group to compete for. Table 3 presents the regression coefficients of self-sacrificing prosociality as a predictor.

Table 3

Regression coefficients of mean self-sacrificing prosociality (SSP) across all Volunteer's dilemma rounds as a predictor of pool contributions

	Ingroup benefit (Pool A contributions)		Ingroup benefit and Outgroup harm (Pool B contributions)	
	B (S.E)	β	B (S.E)	β
Averaged across all IPD-MD rounds				
SSP	.10 (.12)	.08	.26 (.07)***	.33
F		.59		7.66**
R^2		.01		.12

IPD-MD round: 0 bonus points				
SSP	.21 (.14)	.14	.24 (.08)**	.26
<i>F</i>		1.53		5.02**
<i>R</i> ²		.03		.08
IPD-MD round: 10 bonus points				
SSP	.15 (.14)	.10	.27 (.09)**	.28
<i>F</i>		.92		4.80**
<i>R</i> ²		.02		.08
IPD-MD round: 30 bonus points				
SSP	.07 (.13)	.05	.36 (.09)***	.35
<i>F</i>		.19		8.08**
<i>R</i> ²		.003		.12
IPD-MD round: 50 bonus points				
SSP	.08 (.14)	.06	.29 (.08)**	.31
<i>F</i>		.18		6.48**
<i>R</i> ²		.003		.10
		Ingroup benefit (Pool A contributions)	Ingroup benefit and Outgroup harm (Pool B contributions)	
	B (S.E)	β	B (S.E)	β
IPD-MD round: 70 bonus points				
SSP	.07 (.14)	.04	.14 (.10)	.13
<i>F</i>		1.03		2.06
<i>R</i> ²		.02		.03

IPD-MD round: 100 bonus points				
SSP	.04 (.14)	.03	.26 (.09)**	.27
<i>F</i>		.09		5.28**
<i>R</i> ²		.001		.08

* $p \leq .05$, ** $p \leq .01$, *** $p \leq .001$.

Self-sacrificing prosociality (based on all VoD rounds) and mean difference score for outgroup harm. To examine how contributions to outgroup harm may differ from contributions to ingroup benefit across the seven IPD-MD rounds, a difference score for ‘pure’ outgroup aggression was computed by subtracting mean contributions to pool A from mean contributions to pool B. Self-sacrificing prosociality (based on the total number of times the participant volunteered in the VoD game) was submitted as the independent variable while the difference score was utilized as the dependent variable. The mean expectation that other members would contribute in the VoD game rounds was controlled for by submitting this variable as a covariate in this analysis. The overall model was significant, $R^2 = .24$, $F(3, 116) = 12.33$, $p < .001$. Self-sacrificing prosociality significantly predicted outgroup aggression based on the difference score, $\beta = .35$, $t(116) = 2.72$, $p = .01$, after controlling for mean contributions that were kept for oneself, $\beta = .53$, $t(116) = 5.85$, $p < .001$, and the mean expectation that other members will volunteer in the VoD game, $\beta = .19$, $t(116) = 1.13$, $p = .26$.

Self-sacrificing prosociality (based on all VoD rounds) and difference score for outgroup harm in the absence of intergroup competition. To examine how contributions to outgroup harm may differ from contributions to ingroup

benefit for the IPD-MD round when there was no intergroup competition, a difference score for ‘pure’ outgroup aggression when there was no bonus reward for oneself and for group members, was computed by subtracting contributions to pool A from contributions to pool B. Self-sacrificing prosociality (based on the total number of times the participant volunteered in the VoD game) was submitted as the independent variable and the difference score in the absence of bonus reward for oneself and the group (i.e., absence of intergroup competition) were utilized as the dependent variable. The mean expectation that other members would contribute in the VoD game rounds was controlled for by submitting this variable as a covariate in this analysis. The overall model was significant, $R^2 = .26$, $F(3, 116) = 13.77$, $p < .001$. Self-sacrificing prosociality showed a marginally significant effect on outgroup aggression based on the difference score when there was no bonus reward for oneself and for group members, $\beta = .27$, $t(116) = 1.80$, $p = .07$, while controlling for contributions that were kept for oneself in that IPD-MD round, $\beta = .54$, $t(116) = 6.25$, $p < .001$, and the mean expectation that other members will volunteer in the VoD game, $\beta = .28$, $t(116) = 1.39$, $p = .17$, suggesting the prosocial tendencies to self-sacrifice for the ingroup were marginally but positively associated with increased aggression towards the outgroup even when they posed no competition.

Self-sacrificing prosociality (based on VoD 10-3 round) and mean outgroup harm. Linear regression analyses were additionally performed using self-sacrificing prosociality as a binary variable. Self-sacrificing prosociality (based on the VoD 10-3 round which involved the outcomes to either volunteer ($n = 25$) or refrain ($n = 95$)) was submitted as the independent variable and

mean pool B contributions (based on averaged contributions for the seven IPD-MD rounds) was utilized as the dependent variable. The expectation that other members would contribute in the VoD 10-3 round was controlled for by submitting this variable as a covariate in this analysis. The overall model was significant, $R^2 = .05$, $F(2, 117) = 3.12$, $p = .048$. Self-sacrificing prosociality predicted mean pool B contributions, $\beta = .93$, $t(117) = 2.45$, $p = .02$, after controlling for the expectation that other members would contribute in the VoD 10-3 round, $\beta = .03$, $t(117) = .38$, $p = .71$, such that individuals who were more self-sacrificing toward their group were inclined to harm the outgroup (pool B) across intergroup competition. Self-sacrificing prosociality did not predict mean pool A contributions, $p = .79$.

Self-sacrificing prosociality (based on VoD 10-3 round) and outgroup harm in the absence of outgroup harm. Self-sacrificing prosociality (based on the VoD 10-3 round) was submitted as the independent variable and pool B contributions based on the IPD-MD round with the absence of intergroup competition were utilized as the dependent variable. The expectation that other members would contribute in the VoD 10-3 round was controlled for by submitting this variable as a covariate in this analysis. The overall model was significant, $R^2 = .05$, $F(2, 117) = 4.07$, $p = .02$. Interestingly, self-sacrificing prosociality predicted pool B contributions when the bonus reward was zero, $\beta = .97$, $t(117) = 2.26$, $p = .03$, after controlling for the expectation that other members would contribute in the VoD 10-3 round, $\beta = .14$, $t(117) = 1.63$, $p = .11$, suggesting individuals who were highly self-sacrificing toward their group were inclined to harm the outgroup in the absence of intergroup

competition. Self-sacrificing prosociality did not predict pool A contributions in the absence of intergroup competition, $p = .73$.

Self-sacrificing prosociality (based on VoD 10-3 round) and mean difference score for outgroup harm. To examine how contributions to outgroup harm may differ from contributions to ingroup benefit across the seven IPD-MD rounds, a difference score for ‘pure’ outgroup aggression was computed by subtracting mean contributions to pool A from mean contributions to pool B. Self-sacrificing prosociality (based on the VoD 10-3 round) was submitted as the independent variable while the difference score was utilized as the dependent variable. The expectation that other members would contribute in this VoD game round was controlled for by submitting this variable as a covariate in this analysis. The overall model was significant, $R^2 = .22$, $F(3, 116) = 10.75$, $p < .001$. Self-sacrificing prosociality significantly predicted outgroup aggression based on the difference score, $\beta = 1.47$, $t(116) = 2.17$, $p = .03$, after controlling for mean contributions that were kept for oneself, $\beta = .49$, $t(116) = 5.43$, $p < .001$, and the expectation that other members will volunteer in the VoD round, $\beta = .004$, $t(116) = .03$, $p = .97$.

Self-sacrificing prosociality (based on VoD 10-3 round) and difference score for outgroup harm in the absence of intergroup competition. To examine how contributions to outgroup harm may differ from contributions to ingroup benefit for the IPD-MD round when there was no intergroup competition, a difference score for ‘pure’ outgroup aggression when there was no bonus reward for oneself and for group members, was computed by subtracting contributions to pool A from contributions to pool B. Self-sacrificing prosociality (based on the VoD 10-3 round) and the difference score in the

absence of bonus reward for oneself and the group (intergroup competition) were utilized as the dependent variable. The expectation that other members would contribute in this VoD game round was controlled for by submitting this variable as a covariate in this analysis. The overall model was significant, $R^2 = .24$, $F(3, 116) = 13.79$, $p < .001$. Self-sacrificing prosociality showed a marginally significant effect on outgroup aggression based on the difference score when there was no bonus reward for oneself and for group members, $\beta = 1.37$, $t(116) = 1.77$, $p = .08$, while controlling for contributions that were kept for oneself in that IPD-MD round, $\beta = .54$, $t(116) = 6.30$, $p < .001$, and the expectation that other members will volunteer in the VoD round, $\beta = .21$, $t(116) = 1.37$, $p = .17$, suggesting the prosocial tendencies to self-sacrifice for the ingroup was positively associated with increased aggression towards the outgroup even when they posed no competition. There were no gender effects² observed.

Hence, the findings of Studies 1 could be used to derive and compare empirical predictions based on the parochial altruism and bounded generalized reciprocity theories and the CSA framework. In Study 1, according to the bounded generalized reciprocity theory, self-sacrificing prosociality would predict mean pool A contributions which only benefits the ingroup without harming the outgroup. Inferring from the parochial altruism theory, self-

² Self-sacrificing prosociality negatively predicted contributions to pool A in the absence of intergroup competition while controlling for the expectation of the other members volunteering and gender, $b = .22$, $t(116) = 1.52$, $p = .13$. Self-sacrificing prosociality negatively predicted contributions to pool B in the absence of intergroup competition while controlling for the expectation of the other members volunteering and gender, $b = .25$, $t(116) = 2.99$, $p = .003$. Similar results were obtained when the categorical measure of self-sacrificing prosociality was used as the independent variable and mean contributions to pools A, $p_s > .30$, B $p_s < .05$, and difference scores $p = .87$, were the dependent variables.

sacrificing prosociality would predict mean pool B contributions which benefits the ingroup and simultaneously harms the outgroup. Based on the CSA framework, self-sacrificing prosociality would predict mean pool B contributions which benefits the ingroup and simultaneously harms the outgroup. Results showed that self-sacrificing prosociality did not predict mean pool A contributions, suggesting that the bounded generalized reciprocity theory may not explain why highly self-sacrificing members who seek to protect their group members in intragroup contexts contribute to harming the outgroup rather than continuing to contribute toward bolstering the welfare of the ingroup in intergroup contexts. The observation that self-sacrificing prosociality predicted mean pool B contributions may indicate support for parochial altruism theory and the CSA framework. However, the findings based on the difference scores (pool [B-A] contributions) showed that self-sacrificing prosociality positively predicted outgroup aggression that did not include direct benefits for ingroup welfare. These results imply that the parochial altruism theory may not explain why self-sacrificing prosociality in intragroup contexts may predict outgroup aggression instead of parochial altruism.

3.4.6. Mediation analysis with self-sacrificing prosociality as a mediator of the identity fusion – outgroup harm association

Mean outgroup harm as the dependent variable. A mediational model was used to test Hypothesis 2, which predicted that self-sacrificing prosociality towards one's ingroup will mediate the relationship between identity fusion in intragroup contexts and aggression towards the outgroup in intergroup contexts. Self-sacrificing prosociality (based on all VoD rounds) was examined as a

mediator of the relationship between identity fusion and mean pool B contributions based on the seven IPD-MD game rounds. This mediational model was tested using the SPSS PROCESS script for Model 4 (Hayes, 2013). The mean expectation that other members would volunteer in the VoD game was included as a covariate. The overall model with identity fusion as the predictor was significant, $R^2 = .19$, $F(2, 117) = 13.99$, $p < .001$. Identity fusion positively predicted self-sacrificing prosociality, $b = .03$, $SE = .01$, $p < .001$, 95% C.I. [.02, .04]. The overall model with self-sacrificing prosociality as the predictor was significant, $R^2 = .14$, $F(3, 116) = 6.41$, $p = .001$. Self-sacrificing prosociality predicted mean contributions to pool B while controlling for identity fusion, $b = .20$, $SE = .08$, $p = .01$, 95% C.I. [.05, .35]. A bootstrap estimation approach with 10,000 samples showed that the indirect effect of identity fusion was significant, $b = .01$, $SE = .002$, 95% C.I. [.001, .01], indicating evidence of an indirect effect of identity fusion on pool B contributions through self-sacrificing prosociality. Hypothesis 2, which predicted that self-sacrificing prosociality towards one's ingroup will mediate the relationship between identity fusion in intragroup contexts and aggression towards the outgroup in intergroup contexts, was supported. Self-sacrificing prosociality did not mediate the association between identity fusion and the outcome variables on the mean difference score and mean pool A contributions.

Outgroup harm in the absence of intergroup competition as the dependent variable. Self-sacrificing prosociality (based on all VoD rounds) was examined as a mediator of the relationship between identity fusion and pool B contributions in the IPD-MD round when there was no bonus reward. This mediational model was tested using the SPSS PROCESS script for Model 4

(Hayes, 2013). The mean expectation that other members would volunteer in the VoD game was included as a covariate. The overall model with identity fusion as the predictor was significant, $R^2 = .19$, $F(2, 117) = 13.99$, $p < .001$. Identity fusion positively predicted self-sacrificing prosociality, $b = .03$, $SE = .01$, $p < .001$, 95% C.I. [.02, .04]. The overall model with self-sacrificing prosociality as the predictor was significant, $R^2 = .08$, $F(3, 116) = 3.55$, $p = .02$. Self-sacrificing prosociality predicted contributions to pool B in the absence of bonus points while controlling for identity fusion, $b = .21$, $SE = .09$, $p = .02$, 95% C.I. [.03, .38]. A bootstrap estimation approach with 10,000 samples showed that the indirect effect of identity fusion was significant, $b = .01$, $SE = .003$, 95% C.I. [.001, .01], indicating evidence of an indirect effect of identity fusion on pool B contributions through self-sacrificing prosociality, even in the absence of bonus points. Self-sacrificing prosociality did not mediate the association between identity fusion and the outcome variables on difference scores for each bonus round and pools A contributions for each bonus round.

3.5. Discussion

This study hypothesized that self-sacrificing prosociality in intragroup contexts will be positively associated with outgroup aggression in intergroup contexts. Findings supported this hypothesis. Self-sacrificing prosociality was positively associated with aggression towards the outgroup (pool B) in general and even in the absence of incentives and intergroup competition. The second hypothesis that predicted self-sacrificing prosociality towards one's ingroup will mediate the positive association between identity fusion and outgroup aggression, was supported.

The findings of this study could be used to compare empirical predictions based on the parochial altruism and bounded generalized reciprocity theories and the CSA framework. In this study, according to the bounded generalized reciprocity theory, self-sacrificing prosociality would predict mean pool A contributions which only benefits the ingroup without harming the outgroup. Inferring from the parochial altruism theory and the CSA framework, self-sacrificing prosociality would predict mean pool B contributions which benefits the ingroup and simultaneously harms the outgroup.

Results showed that self-sacrificing prosociality did not predict mean pool A contributions, suggesting that the bounded generalized reciprocity theory may not explain why highly self-sacrificing members who seek to protect their group members in intragroup contexts contribute to harming the outgroup rather than continuing to contribute toward bolstering the welfare of the ingroup in intergroup contexts. The observation that self-sacrificing prosociality predicted mean pool B contributions may indicate support for parochial altruism theory and the CSA framework. However, the findings based on the difference scores (pool [B-A] contributions) showed that self-sacrificing prosociality positively predicted outgroup aggression that did not include direct benefits for ingroup welfare. These results imply that the parochial altruism theory may not explain why self-sacrificing prosociality in intragroup contexts may predict outgroup aggression instead of parochial altruism.

In addition, these findings lend support to the proposed theoretical framework of identity fusion. Being alert to the slightest cue of threat, highly fused members may perceive the outgroup as a potential threat to their group of ‘fictive kin’ and may become willing to self-sacrifice for them. In this study,

although participants were informed that there would not be incentives for oneself and other ingroup members for competing with the outgroup (i.e., the IPD-MD round where intergroup competition was absent), the findings imply that highly sacrificing members who might also have strong retaliatory mindsets may have perceived the mere presence of the outgroup as a signal of danger, which calls for aggression to remove the outgroup threat.

3.6. Limitations

A limitation in this study concerned the ambiguity of the underlying motive of contributions to pool B, which may suggest a motive either to maximize intergroup differences (to simultaneously benefit ingroup and harm outgroup) or to only harm the outgroup. Using a difference score between pools A and B showed that self-sacrificing prosociality towards one's ingroup positively predicted outgroup aggression. A second limitation was the low number of highly self-sacrificing members in the VoD 10-3 round. However, studies on identity fusion have shown that highly fused 'precious few' tend to be willing to self-sacrifice to harm the outgroup for the ingroup (Swann et al., 2012). A third limitation was that correlational analyses were conducted with dispositional identity fusion. The later studies will seek to directly manipulate identity fusion to address this limitation.

3.7. Conclusions

Study 1 established the positive relationship between self-sacrificing prosociality towards one's ingroup and outgroup aggression. This study provided support for a mediational relationship between identity fusion and

outgroup harm, through self-sacrificing prosociality in the absence and presence of increasing intergroup competition. A second experiment was designed to distinctly separate the motive to help the ingroup and to harm the outgroup without benefitting the ingroup.

**4. CHAPTER 4: EXAMINING THE MODERATING EFFECT OF
RETALIATORY THINKING ON THE POSITIVE
ASSOCIATION BETWEEN SELF-SACRIFICING
PROSOCIALITY AND OUTGROUP AGGRESSION**

**4.1. Retributory mindsets moderate the association between self-
sacrificing prosociality and outgroup harm**

“The scenes of death in the two mosques are enough to...incite the supporters of the caliphate..., to take vengeance for their religion and for... their Ummah [global Muslim community].” (Abu Hassan al-Muhajir, IS spokesperson in an audio recording after the Christchurch shootings in March 2019, as cited in Callimachi, 2019). Defined as intentional acts of harm in return to perceived injustice and wrongdoing (Stuckless & Goranson, 1992), Schumann and Ross (2010) added that collective vengeance could be motivated by a desire to retaliate as well as ensure that the transgressor outgroup suffers and compensates for the harm done. When strongly self-sacrificing members perceive that their ingroup’s safety, stability, or future could potentially be imperilled by an outgroup, they may interpret this injustice to the ingroup as a threat to the personal self. Such members may willingly self-sacrifice to resolve the threat to their group through aggressive retaliation than to exclusively and tangibly enhance the well-being of the ingroup (Fischer et al. 2010; Swann et al. 2012). Successfully retaliating against the outgroup may directly confront and alleviate the threat for the ingroup which may safeguard the ingroup, compared to solely increasing benefits for the welfare of the ingroup.

Retributive justice, however, is centred on mandatory punishment for a perceived wrongdoing and the proportionality of punishment meted out to the

transgressors (Gerber & Jackson, 2013). Highly self-sacrificing members could view deliberate actions of the outgroup as harmful and unfair to the ingroup, and that aggressive actions are rightful means that signify just deserts and getting even, such that the outgroup suffers deserving and proportionally punitive consequences (Gerber & Jackson, 2013). The findings on vengeance and retributive justice orientations may suggest that highly self-sacrificing individuals with strong retaliatory thinking may most likely expend their personal resources to engage in outgroup aggression relative to solely seeking instrumental ingroup benefit.

Study 2 aimed to replicate the findings of Study 1 by employing a more robust experimental design. The purpose of Study 2 was to test whether self-sacrificing prosociality would be predictive of the motive for outgroup harm, among individuals with retaliatory mindsets. This study introduced the option of a pool C into the IPD-MD that exclusively represented the motive for outgroup harm without instrumental ingroup benefit, compared to pool B which may confound ingroup gain with outgroup harm. Additionally, in Study 1, the different levels of intergroup competition in the form of rewards or bonuses for oneself and the ingroup members, may not directly denote potential for actual harmful behaviour from outgroups. Study 2 hence manipulated the extent to which the outgroup was portrayed to engage in behaviour that harmed the participant and/or his/her group (extent of outgroup contributions to pool C). This study also tested whether these effects emerge when, taking into account, three severity levels of outgroup threat that either affects all ingroup members or only other ingroup members excluding oneself.

4.2. Study hypotheses

There were two hypotheses that were developed and tested in Study 2, in addition to Hypotheses 1 and 2.

Hypothesis 1: *Self-sacrificing prosociality towards one's ingroup in intragroup contexts will be positively associated with aggression towards the outgroup in intergroup contexts.*

Hypothesis 2: *Self-sacrificing prosociality towards one's ingroup in intragroup contexts will mediate the relationship between identity fusion and aggression towards the outgroup in intergroup contexts.*

In an intergroup context, members who are highly self-sacrificing could additionally be highly vigilant toward the presence, intent, and actions of the outgroup as a possible threat to the ingroup. Consequently, members who may have high levels of self-sacrificing prosociality and also engage in vengeful thinking could seek to mitigate the potential threat from the outgroup by retaliating with aggression to solely seeking to provide tangible and direct benefits to the ingroup.

Hypothesis 2a: *Self-sacrificing prosociality for one's ingroup in intragroup contexts will be positively associated with heightened aggression towards the outgroup in intergroup contexts, among members with high levels of vengeance (see Figure 8).*

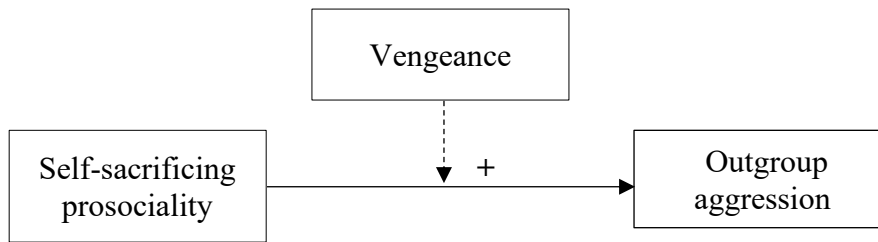


Figure 8. Vengeance as a moderator of the association between self-sacrificing prosociality and outgroup aggression.

Individuals with a strong sense of retributive justice deem that aggressive actions toward perpetrators are rightful means which may communicate signals of *just deserts* and getting even with the inflicted harm. In an intergroup context, highly self-sacrificing members who also have strong retributive justice orientations may view actual threats from the outgroup as harmful and seek to ensure that the outgroup suffers deserving and proportionally punitive repercussions, and thus could be willing to make extreme self-sacrifices to aggress against the outgroup.

Hypothesis 2b: *Self-sacrificing prosociality for one's ingroup in intragroup contexts will be associated with heightened aggression towards the outgroup in intergroup contexts, among members with strong retributive justice orientations (see Figure 9).*

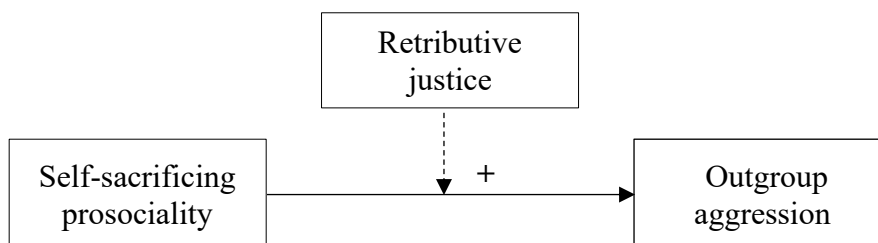


Figure 9. Retributive justice orientation as a moderator of the association between self-sacrificing prosociality and outgroup aggression.

4.3. Method

4.3.1. Participants

A total of 210 participants (48.6% female; $M_{\text{age}} = 36.45$ years, $SD_{\text{age}} = 11.81$) were recruited in the United States through the online MTurk platform to complete two decision-making games. An *a priori* power analysis using the G*Power program (Faul et al., 2009) indicated that, based on a two-group means comparison analysis with three predictors, a total sample size of 128 participants was adequate to have 80% power to detect a medium effect size of .5 at an α -level of .05. Each participant was randomly assigned to a five-member group. To ensure that all participants playing these games individually in this online survey responded and behaved as if they were part of a group, they were told that the other four members in their group had completed the same online survey. Every five-member group was randomly matched to three other groups using an online research randomizer tool. The participants were informed that their group would play against a different, five-member group for every round of the IPD-MD+C game.

4.3.2. Study design

A 2 (outgroup threat target: *only ingroup* vs. *ingroup+self*) x 3 (outgroup threat severity: *no* vs. *low* vs. *high*) mixed-model design was used for this experiment. The between-subjects factor was outgroup threat target that consisted of two levels. The two levels were either outgroup threat to harm all ingroup members (*ingroup+self*) or outgroup threat to harm only ingroup members excluding oneself (*only ingroup*). In the *only ingroup* condition, participants were told that the outgroup members made contributions to reduce the points of the four other

members in the ingroup and that the only member who would not be affected by outgroup contributions was the participant. In the *ingroup+self* condition, participants were told that the outgroup members made contributions to reduce the points of all five members in the ingroup including the participant.

The outgroup threat severity was employed as a within-subjects factor and comprised of three levels which were *no threat*, *low threat*, and *high threat*. For each threat level that was presented in a round, participants were shown the contributions of each outgroup member. In the *no threat* level, participants were shown that outgroup members did not contribute to pools B and C, but made contributions only to pool A. In the *low threat* level, participants were shown that there were large outgroup contributions made to pool A, moderate outgroup contributions to pool B, and minimal outgroup contributions made to pool C. In the *high threat* level, participants were shown that there were substantial outgroup contributions made to pool C, moderate outgroup contributions to pool B, and minimal outgroup contributions made to pool A.

Each participant played nine rounds of the VoD game and three rounds of the IPD-MD+C game. Self-sacrificing prosociality was measured as the total number of times the participant volunteered in all rounds of the VoD game. The cooperative motive to benefit their ingroup was measured by the mean number of points each member contributed to pool A. The motive to maximize differences between one's ingroup and outgroup was measured by the mean number of points each member contributed to pool B. The competitive motive to only cause harm to the outgroup was measured as the mean number of points each member contributed to pool C. Participants were additionally given the option to keep the points for themselves and not contribute to any pool.

4.3.3. Measures

VoD game. Similar to Study 1, the number of points for volunteering and the points that would be deducted from each member if there was no volunteer, varied at three levels – three, five, and ten points. This arrangement resulted in a 3 x 3 matrix with nine cells that were utilized as nine game rounds.

Participants played each round with a new endowment of 10 points. Two measures of self-sacrificing prosociality were utilized in this study. First, self-sacrificing prosociality was measured as the total number of times each player volunteered in all nine rounds. Second, the VoD 10-3 round, where cost to self was 10 points and cost to group was three points, was selected as a key round of self-sacrificing prosociality. Participants were informed that the points they earned in this game would be exchanged for a monetary payout (based on the rate of 20 points for USD0.10) at the end of the experiment (see Appendix B).

Expectations of other members to volunteer in the VoD game. Similar to Study 1, after participants indicated their decision to volunteer or refrain in each round of the VoD game, they were asked to rate how likely their fellow members would volunteer in that round. Participants who volunteered were asked “*How likely do you think other members will volunteer?*”. For participants who refrained, they were asked “*When making my decision to keep, I assumed other players will volunteer their points*”. Both items were measured using a 7-point Likert scale ranging from 1 (*Not at all*) to 7 (*Very much*). For each round, the two items were merged into a variable that represented the expectation of other members to volunteer.

IPD–MD+C game. A third pool labelled as C was introduced in the adapted version of the IPD-MD game which was labelled as IPD-MD+C game

in this study, in addition to pools A, B, and Self. While the role of pool B was to function as a strategy that maximized differences between the two groups, the purpose of pool C was to represent a competitive, aggressive motive intended to only harm the outgroup and would not benefit members of the ingroup and oneself most efficiently. Measuring contributions to only harm the outgroup, Cacault et al. (2015) employed a design where each monetary unit would be deducted from the outgroup and the ingroup would not receive any units. However, in this study, every point contributed to pool C would be first doubled and deducted only from the outgroup. Contributing to pool C differed from contributing to pool B such that the points deducted from the outgroup were not distributed and shared with the group that had invested in pool C. Unlike the game structure devised in Cacault et al. (2015), the effect of contributing to pool C produces the same level of relative difference between ingroup and outgroup in points as pool A and pool B, but by exclusively deducting points from the outgroup. This structure ensures all three pools keep the relative intergroup status controlled, and allows the dominant motive to be isolated. In addition to the VoD game, participants were told that the points they earned in this game would be exchanged for a monetary payout (based on the rate of 20 points for USD0.10) at the end of the experiment.

Favourability toward outgroup. After each IPD-MD+C round, participants responded to a feeling thermometer scale, which measured the favourability toward the outgroup, on a scale ranging from 0 (*Cold or unfavourable*) to 100 (*Warm or favourable*).

Motives of IPD-MD+C pool contributions. After indicating their pool allocations for each IPD-MD+C round, participants answered two items which

assessed their motives for their allocations in each round using a 7-point Likert scale from 1 (*Not at all*) to 7 (*Very much*). The first item was focused on the intention to increase ingroup welfare (“My contributions were aimed at increasing the points for my group”). The second item was focused on the intention to harm the outgroup (“My contributions were aimed at reducing the points of the other group”). Higher scores indicated stronger motivation for the intention underlying their pool allocations.

Affiliation with a real group. Participants were asked to list a group or organization that they strongly supported and were connected to. The aim of this item was to increase the salience of identity fusion as an individual difference by listing a group that one feels strong affiliation for. Individuals with strong characteristic of identity fusion could be thus inclined to be more self-sacrificial toward their ingroup even in minimal groups.

Identity fusion. Identity fusion was measured using the Dynamic Identity Fusion Index (DIFI) that was utilized in Study 1 (Jiménez et al., 2015).

Readiness for self-sacrifice. Readiness for self-sacrifice was measured using the 10-item Readiness for Self-sacrifice scale that was used in Study 1 (Bélanger et al., 2014). The item ‘*I would not be ready to give my life away for an important cause*’ was removed to improve reliability. The Cronbach’s α of the final scale with 9 items was .90.

Vengeance. A 20-item scale developed by Stuckless and Goranson (1992) was used to measure vengeance. Participants answered each item on a 7-point Likert scale that ranged from 1 (*Disagree strongly*) to 7 (*Agree strongly*). Higher scores indicated higher levels of vengeance. Items in the scale include “*I believe in the motto ‘an eye for an eye, a tooth for a tooth’*” and “*It is*

important for me to get back at people who have hurt me". The Cronbach's α of the final scale was .92.

Retributive justice. Participants responded to the 'get even' subscale of the retribution as revenge scale and the proportionality subscale of the retribution as just deserts scale designed by Gerber and Jackson (2013). Each subscale was adapted to the study and consisted of three items that were rated on a 7-point Likert scale that ranged from 1 (*Not agree at all*) to 7 (*Very strongly agree*). Items include "*The severity of the punishment should be proportional to the harm done*" and "*Justice is restored when an offender pays back for the loss he (or she) has caused*". Higher scores denoted a higher level of belief in retributive justice. The Cronbach's α of the final scale was .80.

4.3.4. Procedure

This study was intended to be a replication of Study 1, with the addition of key changes like the inclusion of pool C and the severity of outgroup threat. The procedure for this study was carried out in a similar fashion as in Study 1. After providing his/her consent about participating in the online survey, participants were asked to play the VoD game, followed by the IPD–MD+C game, and respond to the self-report scales and demographic measures. At the end of the survey, participants were shown a debriefing statement about the study and were asked to submit their survey completion code for payment verification.

4.4. Results

4.4.1. Manipulation checks

To check the effectiveness of the outgroup threat manipulation, two separate, one-way repeated measures ANOVA tests were carried out to assess outgroup threat severity on participants' perceptions of hostility and feelings towards the outgroup. There was a main effect of outgroup threat severity on perceptions of hostility, $F(2, 418) = 32.69, p < .001$, and feelings towards the outgroup, $F(2, 418) = 71.20, p < .001$. Based on a scale of 1 (*Not at all*) to 7 (*Very much*), participants perceived the outgroup as strongly hostile in the high threat level ($M = 5.39, SD = 1.46$), compared to the low ($M = 4.94, SD = 1.35$) and no threat levels ($M = 3.54, SD = 1.9$).

Using the feeling thermometer measure that scales from 0 (*Unfavourable and cold*) to 100 (*Favourable and warm*), participants felt the outgroup were highly unfavourable or cold in the high threat level ($M = 37.30, SD = 21.70$), compared to the low ($M = 44.51, SD = 19.15$) and no threat levels ($M = 57.70, SD = 24.39$). Participants' understanding of the VoD game rules averaged at 4.91 ($SD = 1.03$) and their understanding of the IPD-MD+C game rules averaged at 3.27 ($SD = 1.18$), on a 6-point Likert scale of 1 (*Strongly disagree to understanding*) to 6 (*Strongly agree to understanding*). The mean VoD quiz score was 3.67 ($SD = .80$), where a maximum score of 4 indicate all correct answers to the four questions. The mean IPD-MD+C quiz score was 2.17 ($SD = .87$), where a maximum score of 3 indicate all correct answers to the three questions.

4.4.2. Correlations between self-sacrificing prosociality and mean pool contributions

The skewness value of totalled self-sacrificing prosociality variable was .594 which was within ± 1.00 criterion, as recommended by Meyers et al. (2013). Correlation results indicated that there were moderate associations between self-sacrificing prosociality in the VoD game and contributions to the three pools in the IPD-MD+C game, $r_s(210) < .28, p_s < .01$. Table 4 presents the correlations between self-sacrificing prosociality (summed across all VoD rounds) and mean contributions to pool A (ingroup benefit), pool B (ingroup benefit and outgroup aggression), pool C (outgroup harm), and Self pool in Study 2.

Table 4

Correlation coefficients of total self-sacrificing prosociality across the VoD game and mean pool contributions in the IPD-MD+C game in Study 2.

	1	2	3	4	5
1. Self-sacrificing prosociality	1				
2. Ingroup benefit (Mean Pool A contributions)	.10	1			
3. Parochial altruism (Mean Pool B contributions)	.28***	-.15*	1		

4. Outgroup harm					
(Mean Pool C contributions)	.20**	-.25***	.43***		1
5. Mean Self pool contributions	-.30***	-.69***	-.49***	-.41***	1

* $p \leq .05$, ** $p \leq .01$, *** $p \leq .001$.

4.4.3. Means comparisons of VoD game and IPD-MD+C game

Means comparisons of volunteering rate in the VoD game. Across all nine rounds in the VoD game, self-sacrificing prosociality averaged at 2.58 times of volunteering ($SD = 2.08$). A two-way, repeated-measures ANOVA was conducted to compare the effect of cost to self and the effect of cost to group if no member volunteered, on the willingness to volunteer. The purpose of this analysis was to provide descriptive results on the VoD game. The expectation that group members will volunteer for all rounds was included as a covariate. There were significant main effects for cost to self for volunteering, $F(2, 416) = 22.29, p < .001$, and for cost to the group if no member volunteered, $F(2, 416) = 7.81, p < .01$. Participants volunteered significantly more when the cost of volunteering to self was three points ($M = .45, SD = .03$), than five ($M = .28, SD = .02$) and ten points ($M = .14, SD = .02$), $p < .01$. Participants volunteered significantly more when the cost to the group if no member volunteered was ten points ($M = .37, SD = .02$), than three points ($M = .22, SD = .02$) and five ($M = .28, SD = .02$), $p < .01$. There was no significant interaction between the cost to self for volunteering and the cost to the group if no member volunteered, $F(2, 416) = 2.06, p = .09$.

Means comparisons of pool allotments in the IPD-MD+C game. Across all three rounds in the IPD-MD+C game, participants contributed an average of 3.05 points to pool A ($SD = 2.60$), 1.48 points to pool B ($SD = 1.29$), 1.31 points to pool C ($SD = 1.34$), and kept 4.16 points for themselves ($SD = 2.99$). Two separate, mixed-model analyses involving the costs for self and the group in the VoD game rounds as well as the pool types and the outgroup threat severity levels in the IPD-MD+C game rounds showed that the between-subjects factor on outgroup threat target was not significant, $p_s > .05$, and thus the two conditions were merged in subsequent analyses.

A two-way, repeated-measures ANOVA was conducted to compare the effect of pool type (A, B, and C) and the effect of outgroup threat severity (no, low, and high), on the amount of point contributions. The purpose of this analysis was to provide descriptive results on the IPD-MD+C game. The mean points that were kept for oneself was included as a covariate. There was no significant main effect for outgroup threat severity, $F(2, 416) = 1.78, p = .17$. There was a significant main effect for pool type, $F(2, 416) = 83.84, p < .001$. Participants contributed significantly more to pool A ($M = 3.05, SD = .13$) than pool B ($M = 1.48, SD = .08$) and pool C ($M = 1.31, SD = .09$), $p < .01$. There was a significant interaction effect for pool type and for outgroup threat severity, $F(4, 832) = 10.56, p < .001$. When outgroup threat was absent, participants contributed significantly more to pool A ($M = 3.43, SD = .17$), than to pool B ($M = 2.91, SD = .15$) and to pool C ($M = 2.80, SD = .19$), $p < .001$. When outgroup threat was low, participants contributed significantly more to pool C ($M = 1.75, SD = .13$), than to pool A ($M = 1.06, SD = .09$) and to pool B ($M = 1.61, SD = .12$), $p = .01$. When outgroup threat was high, participants

contributed significantly more to pool C ($M = 1.76, SD = .15$) than to pool A ($M = 1.00, SD = .10$), $p = .002$. There was no significant difference between contributions to pool B ($M = 1.17, SD = .10$) and C, $p = 1.00$. Figure 10 presents the means of the contributions to pools A, B, and C under the three outgroup threat levels.

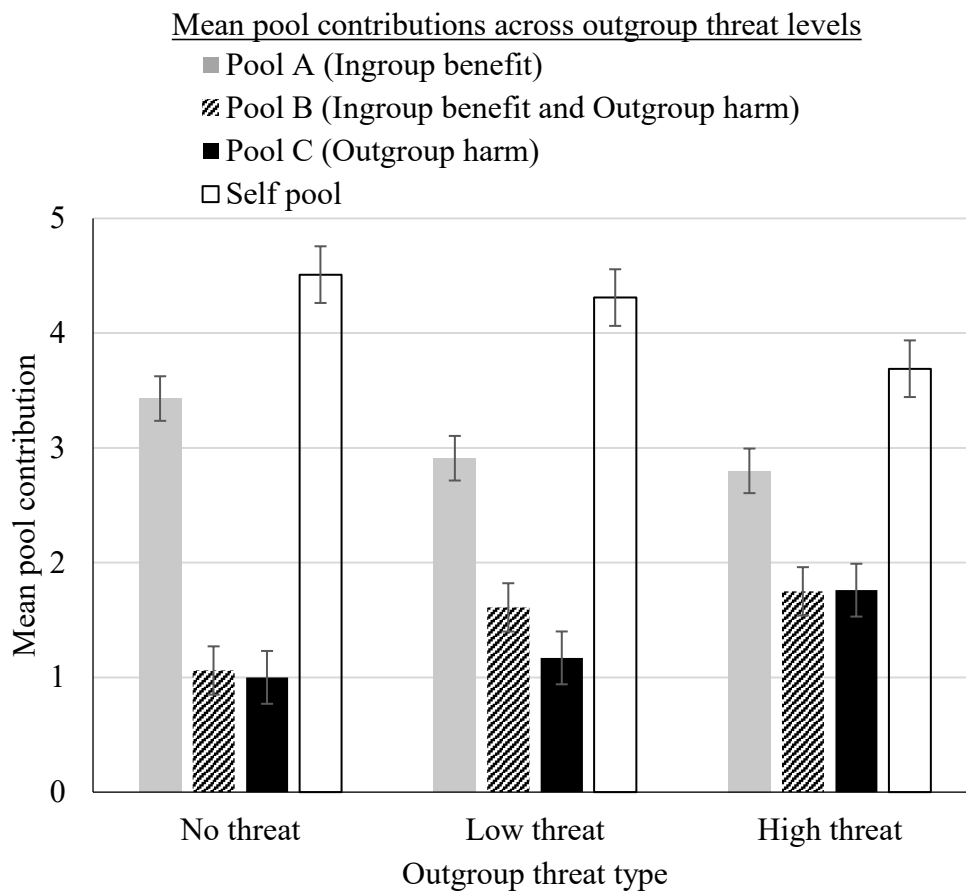


Figure 10. Means of pool contributions across the three outgroup threat severity levels. The error bars represent standard errors.

4.4.4. Means comparisons of motives underlying pool contributions

The underlying motives of the pool allocations in the absence of outgroup threat were analyzed using t -tests as in Study 1. The VoD10-3 round was utilized as

the independent variable. The two motives of pool allocations in the IPD-MD+C game were used as dependent variables. Individuals with high self-sacrificing prosociality ($M = 3.75$, $SD = 1.45$) reported significantly stronger motivation to reduce the points of the other group when there was no outgroup threat than those with low self-sacrificing prosociality ($M = 2.85$, $SD = 2.00$), $t(208) = 2.55$, $p = .02$. There was no significant difference between individuals with high ($M = 4.30$, $SD = 1.75$) and low self-sacrificing prosociality ($M = 4.87$, $SD = 1.96$) in their intentions to increase ingroup benefit, $t(208) = -1.25$, $p = .21$.

4.4.5. Linear regression analyses testing the effect of self-sacrificing prosociality on outgroup harm

Linear regression analyses were utilized to examine Hypothesis 1 which posited whether self-sacrificing prosociality in intragroup contexts was predictive of outgroup harm in intergroup contexts. There were two measures of self-sacrificing prosociality selected as predictors for these analyses. The first measure was the continuous variable of self-sacrificing prosociality based on the total number of times the participant volunteered in the VoD game. This measure may involve VoD rounds that may not be highly sensitive and relevant to self-sacrificing prosociality such as the VoD 3-3 where one would be willing to lose only three points so as to avert a miniscule loss of three points for the other members in the group. The second measure was the categorical variable of self-sacrificing prosociality based on the VoD 10-3 round, which was selected *a priori* as representative of self-sacrificing prosociality. This round measured self-sacrificing prosociality where one would be willing to lose all of

his (or her) 10 points so as to avert a miniscule loss of three points for the other members in the group. The purpose of this analysis was to establish whether self-sacrificing prosociality in intragroup contexts would predict outgroup harm in intergroup contexts in this study.

Self-sacrificing prosociality (based on all VoD rounds) and mean outgroup harm. Self-sacrificing prosociality (based on all the VoD rounds) was submitted as the independent variable and mean pool C contributions (that were averaged across the three IPD-MD+C rounds of varying outgroup threat) were utilized as the dependent variable. The mean expectation that other members would contribute in the VoD game rounds was controlled for by submitting this variable as a covariate in this analysis. The overall model was significant, $R^2 = .04$, $F(2, 207) = 4.75$, $p = .01$. Self-sacrificing prosociality predicted mean allocations to pool C, $\beta = .14$, $t(207) = 3.07$, $p = .002$, after controlling for the expectation that group members will volunteer in the VoD game, $\beta = .05$, $t(207) = .75$, $p = .45$, such that members with self-sacrificing prosociality were more likely to harm the outgroup.

Self-sacrificing prosociality (based on all VoD rounds) and outgroup harm in the absence of outgroup threat. Self-sacrificing prosociality (based on all the VoD rounds) was submitted as the independent variable and pool C contributions in the IPD-MD+C round with no outgroup threat was utilized as the dependent variable. The mean expectation that other members would contribute in the VoD game rounds was controlled for by submitting this variable as a covariate in this analysis. The overall model was significant, $R^2 = .03$, $F(2, 207) = 3.80$, $p = .02$. Self-sacrificing prosociality predicted allocations to pool C in the absence of outgroup threat, $\beta = .13$, $t(207) = 2.70$, p

= .008, after controlling for the expectation that group members will volunteer in the VoD game, $\beta = -.01$, $t(207) = -.15$, $p = .88$, suggesting that individuals who were more self-sacrificing toward their group were more inclined to harm the outgroup even when members in the outgroup were portrayed as making allocations only to their group's pool A which did not involve direct aggression to the ingroup (see Table 5).

Table 5

Regression coefficients of mean self-sacrificing prosociality (SSP) across all Volunteer's dilemma rounds as a predictor of pool contributions

	Ingroup benefit (Pool A contributions)		Ingroup benefit and Outgroup harm (Pool B contributions)		Outgroup harm (Pool C contributions)	
	B (S.E)	β	B (S.E)	β	B (S.E)	β
Across three threat levels						
SSP	.13 (.09)	.10	.18 (.04)***	.29	.14 (.04)**	.21
<i>F</i>	1.04		9.31***		4.75**	
<i>R</i> ²	.01		.08		.04	
No outgroup threat						
SSP	.12 (.11)	.07	.20 (.05)***	.29	.13 (.05)**	.19
<i>F</i>	.78		8.91***		3.80*	
<i>R</i> ²	.01		.08		.04	
Low outgroup threat						
SSP	.19 (.09)*	.15	.14 (.06)*	.15	.12 (.05)*	.16

<i>F</i>	2.80		3.76*		3.45*	
<i>R</i> ²	.03		.04		.03	
High outgroup threat						
SSP	.07 (.11)	.05	.21 (.07)**	.22	.15 (.07)*	.14
<i>F</i>	.22		5.54**		2.15	
<i>R</i> ²	.02		.05		.02	

* $p \leq .05$, ** $p \leq .01$, *** $p \leq .001$.

Self-sacrificing prosociality (based on all VoD rounds) and difference score for outgroup harm. A difference score for ‘pure’ outgroup aggression was computed by first summing mean contributions to pools B and C and subtracting mean contributions to pool A from the summed contributions. Self-sacrificing prosociality (based across all the VoD rounds) was submitted as the independent variable and the difference score was utilized as the dependent variable. The mean expectation that other members would contribute in the VoD game rounds was controlled for by submitting this variable as a covariate in this analysis. The overall model was significant, $R^2 = .04$, $F(3, 206) = 3.70$, $p = .013$. Self-sacrificing prosociality did significantly predicted outgroup aggression based on the difference score, $\beta = .31$ $t(206) = 2.34$, $p = .02$, after controlling for mean points kept for oneself, $\beta = .27$, $t(206) = 2.95$, $p = .004$, and the expectation that other members will volunteer in the VoD game, $\beta = .13$, $t(206) = .70$, $p = .49$.

Self-sacrificing prosociality (based on all VoD rounds) and difference score for outgroup harm in the absence of outgroup threat. A difference score for ‘pure’ outgroup aggression was computed by first summing contributions to

pools B and C in the round with no outgroup threat and subtracting contributions to pool A in the same round from the summed contributions. Self-sacrificing prosociality (based across all the VoD rounds) was submitted as the independent variable while the difference score based on the round with no outgroup threat was utilized as the dependent variable. The mean expectation that other members would contribute in the VoD game rounds was controlled for by submitting this variable as a covariate in this analysis. The overall model was significant, $R^2 = .12$, $F(3, 206) = 9.41$, $p < .001$. Self-sacrificing prosociality significantly predicted outgroup aggression based on the difference score, $\beta = .41$, $t(206) = 2.72$, $p = .007$, after controlling for points kept for oneself in this round, $\beta = .44$, $t(206) = 5.06$, $p < .001$, and the expectation that other members will volunteer in the VoD game, $\beta = -.03$, $t(206) = -.14$, $p = .89$.

Self-sacrificing prosociality (based on VoD 10-3 round) and mean outgroup harm. Linear regression analyses were additionally performed using self-sacrificing prosociality as a categorical variable. Self-sacrificing prosociality (based on the VoD 10-3 round which involved the outcomes to either volunteer or refrain) was submitted as the independent variable and mean pool C contributions (based on averaged contributions for the three IPD-MD+C rounds) was utilized as the dependent variable. The expectation that other members would contribute in the VoD 10-3 round was controlled for by submitting this variable as a covariate in this analysis. The overall model was significant, $R^2 = .02$, $F(2, 207) = 2.99$, $p = .05$. Self-sacrificing prosociality predicted mean pool C contributions, $\beta = .76$, $t(207) = 2.45$, $p = .02$, after controlling for the expectation that other members would contribute in the VoD 10-3 round, $\beta = .01$, $t(207) = .13$, $p = .90$, such that individuals who were more

self-sacrificing toward their group were inclined to solely harm the outgroup (pool C) across outgroup threat levels. Likewise, self-sacrificing prosociality predicted mean pool B contributions, $\beta = 1.06$, $t(207) = 3.59$, $p < .001$, after controlling for the expectation that other members would contribute in the VoD 10-3 round, $\beta = .04$, $t(207) = 1.03$, $p = .31$. Self-sacrificing prosociality did not predict mean pool A contributions, $p = .73$.

Self-sacrificing prosociality (based on VoD 10-3 round) and outgroup harm in the absence of outgroup threat. Self-sacrificing prosociality (based on the VoD 10-3 round) was submitted as the independent variable and pool C contributions based on the IPD-MD+C round with the absence of outgroup threat were utilized as the dependent variable. The expectation that other members would contribute in the VoD 10-3 round was controlled for by submitting this variable as a covariate in this analysis. The overall model was significant, $R^2 = .04$, $F(2, 207) = 5.02$, $p = .007$. Interestingly, self-sacrificing prosociality predicted pool C contributions when there was no outgroup threat, $\beta = .105$, $t(207) = 3.13$, $p = .002$, after controlling for the expectation that other members would contribute in the VoD 10-3 round, $\beta = .03$, $t(207) = .54$, $p = .59$, suggesting individuals who were highly self-sacrificing toward their group were inclined to harm the outgroup. Similarly, self-sacrificing prosociality predicted pool B contributions when there was no outgroup threat, $\beta = 1.65$, $t(207) = 5.21$, $p < .001$, after controlling for the expectation that other members would contribute in the VoD 10-3 round, $\beta = .04$, $t(207) = .99$, $p = .32$. Self-sacrificing prosociality did not predict pool A contributions in the absence of intergroup competition, $p = .58$.

Self-sacrificing prosociality (based on VoD 10-3 round) and difference scores for outgroup harm. A difference score for ‘pure’ outgroup aggression was computed by first summing mean contributions to pools B and C and subtracting mean contributions to pool A from the summed contributions. Self-sacrificing prosociality based on the VoD 10-3 round was submitted as the independent variable while the difference score was utilized as the dependent variable. The expectation that other members would contribute in the VoD 10-3 round was controlled for by submitting this variable as a covariate in this analysis. The overall model was significant, $R^2 = .05$, $F(3, 206) = 4.37$, $p = .005$. Self-sacrificing prosociality significantly predicted outgroup aggression based on the difference score, after controlling for mean points kept for oneself and the expectation that other members will volunteer in the VoD game, $\beta = 2.43$, $t(206) = 2.74$, $p = .007$, after controlling for points kept for oneself in this round, $\beta = .24$, $t(206) = 2.77$, $p = .006$, and the expectation that other members will volunteer in the VoD game, $\beta = .03$, $t(206) = .21$, $p = .83$.

Self-sacrificing prosociality (based on VoD 10-3 round) and difference score for outgroup harm in the absence of outgroup threat. A difference score for ‘pure’ outgroup aggression was computed by first summing contributions to pools B and C in the round with no outgroup threat and subtracting contributions to pool A in the same round from the summed contributions. Self-sacrificing prosociality (based across all the VoD rounds) was submitted as the independent variable while the difference score based on the round with no outgroup threat was utilized as the dependent variable. The expectation that other members would contribute in the VoD 10-3 round was controlled for by submitting this variable as a covariate in this analysis. The overall model was

significant, $R^2 = .15$, $F(3, 206) = 12.84$, $p < .001$. Self-sacrificing prosociality significantly predicted outgroup aggression based on the difference score, $\beta = 4.14$, $t(206) = 4.14$, $p < .001$, after controlling for points kept for oneself in this round, $\beta = .45$, $t(206) = 5.32$, $p < .001$, and the expectation that other members will volunteer in the VoD game, $\beta = .04$, $t(206) = .27$, $p = .79$. There were no significant gender effects³.

4.4.6. Mediation analysis with self-sacrificing prosociality as the mediator in the identity fusion – outgroup harm association

Mean outgroup harm as dependent variable. Self-sacrificing prosociality (based on all VoD rounds) was examined as a mediator of the relationship between identity fusion and mean pool C contributions across the three IPD-MD+C rounds. This mediational model was tested using the SPSS PROCESS script for Model 4 (Hayes, 2013). The mean expectation that other members would volunteer in the VoD game was included as a covariate. The overall model with identity fusion as the predictor was significant, $R^2 = .03$, $F(2, 207) = 3.09$, $p = .047$. Identity fusion did not significantly predict self-sacrificing prosociality, $b = .005$, $SE = .004$, $p = .29$, 95% C.I. [-.004, .01]. The overall

³ Additional linear regression analyses with the continuous measure of self-sacrificing prosociality as the independent variable and mean contributions to pools A, B, and C as the dependent variables were conducted using expectation of other members to volunteer in the VoD game, and gender as a covariate. Self-sacrificing prosociality positively predicted contributions to pool C in the absence of outgroup threat, $b = .13$, $t(206) = 2.96$, $p = .01$. Self-sacrificing prosociality did not predict contributions to pool A in the absence of outgroup threat, $b = .13$, $t(206) = 1.45$, $p = .15$. Self-sacrificing prosociality positively predicted contributions to pool B in the absence of outgroup threat, $b = .18$, $t(206) = 4.19$, $p < .001$. Similar results were obtained when the categorical measure of self-sacrificing prosociality was used as the independent variable and mean contributions to pools A, $p = .15$, as well as B and C $p_s < .01$ were the dependent variables.

model with self-sacrificing prosociality as the predictor was significant, $R^2 = .05$, $F(3, 206) = 3.28$, $p = .02$. Self-sacrificing prosociality predicted mean contributions to pool C in the IPD-MD game while controlling for identity fusion, $b = .14$, $SE = .04$, $p = .002$, 95% C.I. [.05, .23]. A bootstrap estimation approach with 10,000 samples showed that the indirect effect of self-sacrificing prosociality was not significant, $b = .001$, $SE = .001$, 95% C.I. [-.001, .002]. Self-sacrificing prosociality did not mediate the association between identity fusion and the outcome variables on pools A, B, and C contributions for each IPD-MD+C round. Similarly, this mediational relationship was not significant when pool C contributions in the absence of outgroup threat was used as an outcome variable. Hypothesis 2, which predicted self-sacrificing prosociality towards one's ingroup will mediate the relationship between identity fusion and aggression towards the outgroup, was not supported.

4.4.7. Moderation analysis with retaliatory mindsets (vengeance and retributive justice orientations) as moderators of the self-sacrificing prosociality – outgroup harm association

Four moderation models were examined using Model 1 in the SPSS PROCESS script (Hayes, 2013). There were two measures of self-sacrificing prosociality selected for these analyses. The first measure was the continuous variable of self-sacrificing prosociality based on the total number of times the participant volunteered in the VoD game. The second measure was the categorical variable of self-sacrificing prosociality based on the VoD 10-3 round and selected *a priori* to be representative of self-sacrificing prosociality. This round measured self-sacrificing prosociality where one would be willing to lose all of

his (or her) 10 points so as to avert a miniscule loss of three points for the other members in the group.

Self-sacrificing prosociality (based on all VoD rounds) and vengeance. In the first model, vengeance was tested as a moderator of self-sacrificing prosociality (based on all VoD rounds), and pool C contributions when the outgroup did not pose a threat to the ingroup. The overall model was significant, $R^2 = .06$, $F(4, 205) = 3.11$, $p = .02$. There was no significant interaction effect of vengeance moderating the association between self-sacrificing prosociality (based on all VoD rounds) and pool C contributions when there was no threat from the outgroup, $b = .06$, $t(205) = 1.40$, $p = .16$. Similarly, there were no significant moderation effects observed for contributions to pools A and B under the three severity levels of outgroup threat as well as for contribution to pool C when the severity of outgroup threat was low or high.

Self-sacrificing prosociality (based on VoD 10-3 round) and vengeance. In the second model, vengeance was tested as a moderator of self-sacrificing prosociality (based on the VoD 10-3 round), and pool C contributions when the outgroup did not pose a threat to the ingroup. Compared to other rounds, the VoD 10-3 round was selected as a key round that closely represented self-sacrificing prosociality where one would be willing to lose all of his (or her) 10 points so as to avert a miniscule loss of three points for the other members in the group. The expectation that other members would contribute in the VoD 10-3 round was controlled for. Vengeance, which was a continuous variable, was standardized to plot the moderator effects based on the representative values and to interpret the effects of the predictor (Cohen et al., 2013). The overall

model was significant, $R^2 = .07$, $F(4, 205) = 4.12$, $p = .003$. There was a significant interaction effect of vengeance moderating the association between self-sacrificing prosociality in the VoD 10-3 round and pool C contributions when there was no threat from the outgroup, $b = .71$, $t(205) = 2.05$, $p = .04$ (see Figure 11). At high levels of vengeance, individuals with strong self-sacrificing prosociality in the VoD 10-3 round were more likely to make contributions to pool C even in the absence of outgroup threat compared to individuals with low self-sacrificing prosociality, $b = .80$, $p = .02$. At low levels of vengeance, individuals with low and high self-sacrificing prosociality in the VoD 10-3 round did not differ significantly in their contributions to pool C, $b = .08$, $p = .37$ (see Figure 12). This moderation effect was not found for contributions to pools A and B under the three severity levels of outgroup threat. This moderation effect was not found for contribution to pool C when the severity of outgroup threat was low or high. Hypothesis 2a, which predicted self-sacrificing prosociality for one's ingroup will be associated with heightened aggression towards the outgroup, among members with strong levels of vengeance, was thus supported.

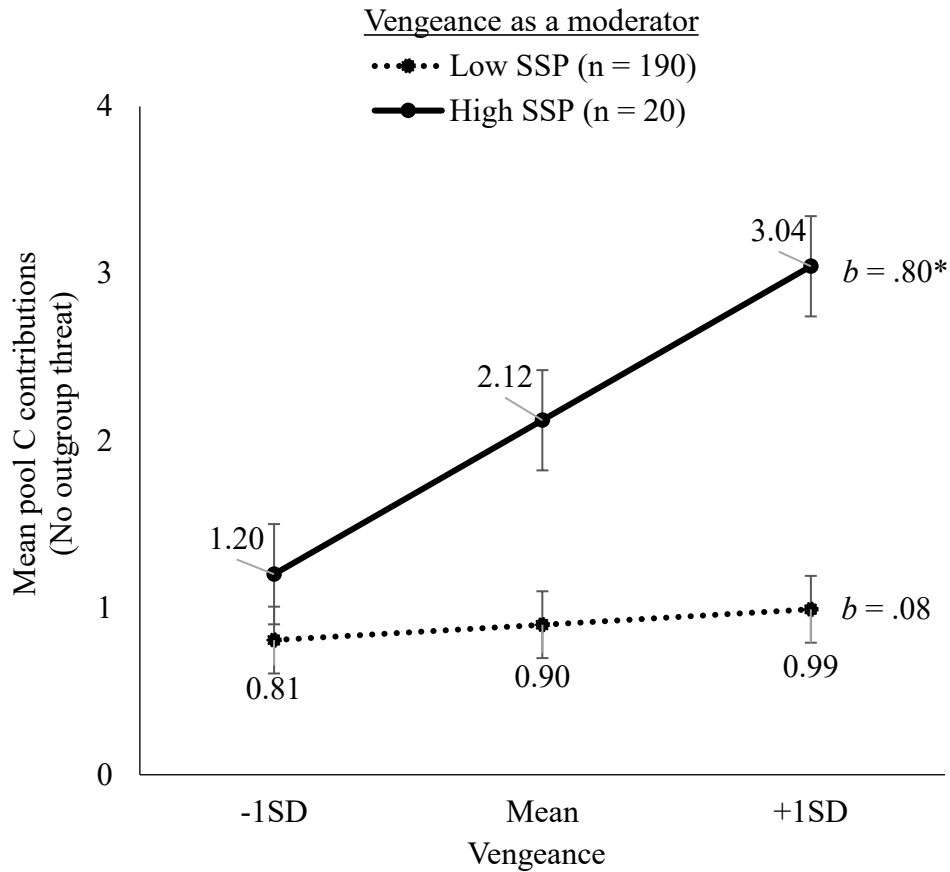


Figure 11. Vengeance as a moderator of the association between self-sacrificing prosociality (SSP) in the VoD 10-3 round and pool C allocations (outgroup harm) in the absence of outgroup threat. The error bars represent standard errors. $*p \leq .05$, $**p \leq .01$, $***p \leq .001$.

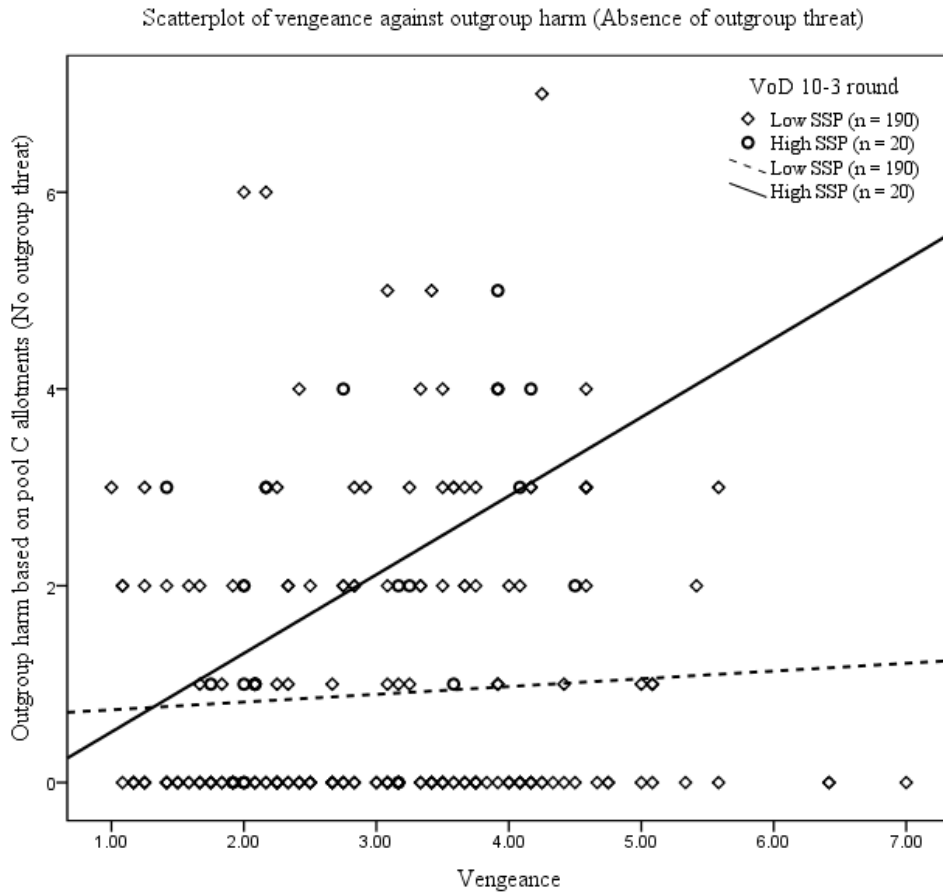


Figure 12. Scatterplot of vengeance against pool C allocations (outgroup harm) in the absence of outgroup threat with trendlines based on individuals with low and high self-sacrificing prosociality (SSP) in the VoD 10-3 round.⁴

Self-sacrificing prosociality (based on all VoD rounds) and retributive justice orientation. In the third model, retributive justice was tested as a moderator of the association between self-sacrificing prosociality (based on all VoD rounds) and pool C contributions when the outgroup posed as a low threat

⁴ Based on this figure, pool C contributions that are close to 0 are largely from individuals with low self-sacrificing prosociality (i.e., the distribution of diamonds). However, pool C contributions that are from individuals with high self-sacrificing prosociality tend to be scattered above 0 and above low levels of vengeance. This observation does not affect the moderation results and was in line with Hypothesis 2b that predicted self-sacrificing prosociality for one's ingroup in intragroup contexts will be positively associated with heightened aggression towards the outgroup in intergroup contexts, among members with high levels of vengeance.

to the ingroup. The overall model was significant, $R^2 = .08$, $F(4, 205) = 4.18$, $p = .003$. There was a significant interaction effect of retributive justice moderating the association between self-sacrificing prosociality (based on all VoD rounds) and pool C contributions when there was low threat from the outgroup, $b = .11$, $t(205) = 2.69$, $p = .008$. At high levels of retributive justice orientation, members with high self-sacrificing prosociality were more likely to contribute to pool C when there was a low level of outgroup threat, $b = .30$, $p = .002$. At low levels of retributive justice orientation, members with low and high self-sacrificing prosociality did not differ from one another in their pool C contributions, $b = .04$, $p = .56$. Similar significant moderation effects were obtained for contributions to pool B when the outgroup threat was low and for contributions to pool C when the severity of outgroup threat was no and high. There were no significant moderation effects of retributive justice orientations observed for contributions to pools A under the three severity levels of outgroup threat.

Self-sacrificing prosociality (based on the VoD 10-3 round) and retributive justice orientation. In the fourth model, retributive justice was tested as a moderator of the association between self-sacrificing prosociality (based on the VoD 10-3 round) and pool C contributions when there was low threat from the outgroup. The expectation that other members would contribute in the VoD 10-3 round was controlled for. Retributive justice which was a continuous variable was standardized to aid the plotting of the graph and interpretation of predictor effects. The overall model was significant, $R^2 = .07$, $F(4, 205) = 3.73$, $p = .006$. There was a significant interaction effect of retributive justice moderating the association between self-sacrificing prosociality in VoD 10-3

round and pool C contributions when there was low threat from the outgroup, $b = 1.07$, $t(205) = 2.44$, $p = .02$, (see Figure 13). At high levels of retributive justice orientation, members who were highly self-sacrificing in the VoD 10-3 round were more likely to contribute to pool C when there was a low level of outgroup threat, $b = 1.12$, $p = .01$. At low levels of retributive justice orientation, members with low and high self-sacrificing prosociality in the VoD 10-3 round did not differ from one another in their pool C contributions, $b = .06$, $p = .53$ (see Figure 14). This moderation effect was not found for contributions to pools A and B under the three severity levels of outgroup threat. This moderation effect was not found for contribution to pool C when the severity of outgroup threat was absent or high. Compared to the continuous variable of self-sacrificing prosociality based on all VoD rounds, the categorical variable of self-sacrificing prosociality based on the VoD 10-3 round could be a better discriminator of the situational constraints of when highly self-sacrificing individuals may harm the outgroup, wherein the low outgroup threat level was identified. Hypothesis 2b, which predicted self-sacrificing prosociality for one's ingroup will be associated with heightened aggression towards the outgroup, among members with strong retributive justice orientations, was thus supported.

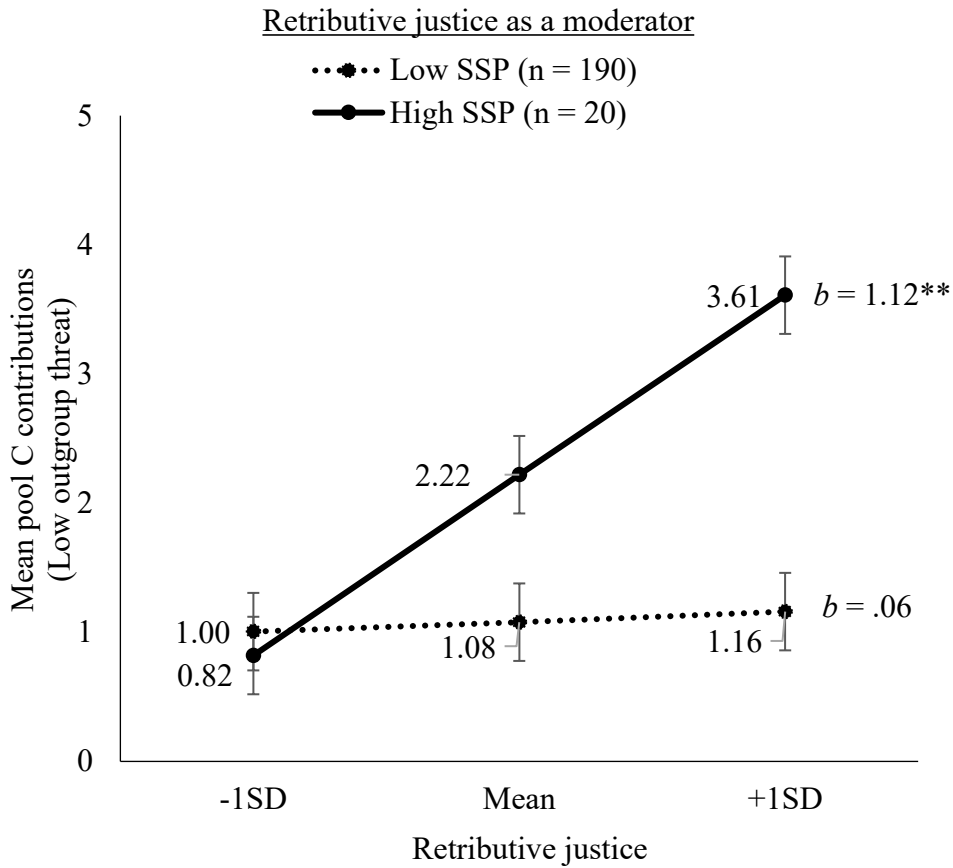


Figure 13. Retributive justice as a moderator of the association between self-sacrificing prosociality (SSP) and pool C contributions (outgroup harm) during low outgroup threat. The error bars represent standard errors.

* $p \leq .05$, ** $p \leq .01$, *** $p \leq .001$.

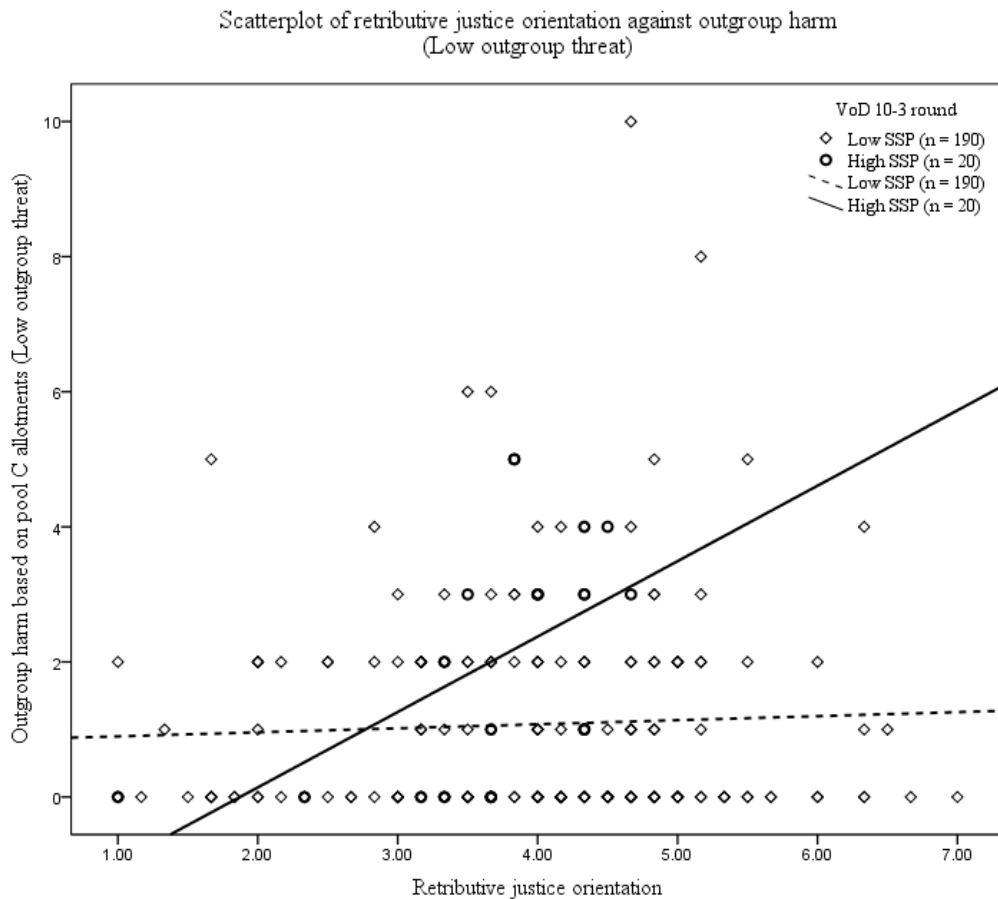


Figure 14. Scatterplot of retributive justice orientation correlated against pool C allocations (outgroup harm) in low outgroup threat and with trendlines based on individuals with low and high self-sacrificing prosociality (SSP) in the VoD 10-3 round.

4.5. Discussion

This study hypothesized whether members with high self-sacrificing prosociality would be inclined toward aggressing against the outgroup when presented with the option to exclusively harm the outgroup. Findings supported the hypothesis. Though the non-significance of difference scores and that groups contributed more of their points to pool A and to the Self pool, participants with high self-sacrificing prosociality were more likely to

contribute to pool C which exclusively represented outgroup aggression, and to pool B that maximized differences between ingroup and outgroup, even in the absence of outgroup threat. This finding suggested that individuals with high self-sacrificing prosociality could perceive the outgroup to be potentially harmful to the ingroup, even when threat from the outgroup was absent. Self-sacrificing prosociality could be less sensitive to the motivation to contribute to ingroup benefit (pool A) compared to that of pools B and C which involve a competitive motive.

As predicted, strongly self-sacrificing members who were also high in vengeance were more willing to contribute to outgroup harm (pool C), than maximize differences via pool B contributions or benefit the ingroup members by contributions to pool A, in the absence of outgroup threat. While there was no outgroup harm inflicted directly on the ingroup, highly self-sacrificing members who may also possess vengeful mindsets may have perceived outgroup members contributing within their pool A, which potentially strengthens the position of the outgroup, as a threat that can lead the ingroup to fall behind, and a gesture that warrants retaliation. Though contributing to pool C may not be a strategy that benefit the ingroup most efficiently, highly self-sacrificing members may feel that taking revenge and retaliating to ‘even the score’ was necessary. In the low outgroup threat level where the harm to ingroup could be viewed as a deliberate and trivial provocation, highly self-sacrificing members who also possess a strong sense of retributive justice may prioritize harming the outgroup over solely and tangibly benefitting the ingroup. Individuals with a retributive justice orientation would most likely respond back to the harm that was imposed in proportionate magnitude rather

than the harm being perceived. In contrast to self-sacrificing prosociality measured using all VoD rounds, the results insinuate that self-sacrificing prosociality based on the VoD 10-3 round could be more sensitive in specifically identifying the low outgroup threat level where individuals who may possess also strong retributive justice orientations were more likely to allot to pool C. Anticipating potential harm from the outgroup, these members may consequently self-sacrifice to retaliate against the outgroup.

Although the relationship between self-sacrificing prosociality and maximization of intergroup differences was observed in the linear regression analyses, findings from the two moderation analyses (with vengeance and retributive justice orientations) demonstrated support for the association between self-sacrificing prosociality and outgroup aggression. The theory of parochial cooperation and the theory of bounded generalized reciprocity would predict that highly self-sacrificing members seek to protect the ingroup by maximize intergroup differences or bolstering its welfare in absolute terms. However, corresponding to the CSA framework, highly self-sacrificing members who may also possess strong retributive mindsets would be more likely to perceive the outgroup as a threat and may seek to protect the ingroup by retaliating against the outgroup than enhancing ingroup welfare.

4.6. Limitations

Similar to Study 1, the number of highly self-sacrificing members in VoD 10-3 game round was lower than that of members with low self-sacrificing prosociality. However, there could be few individuals who may be highly willing to self-sacrifice their personal endowment involving real stakes for the

ingroup than individuals who report to be more willing to sacrifice for their ingroups in hypothetical scenarios like the trolley dilemma (Swann et al., 2015).

4.7. Conclusions

Members who develop strong commitment with their ingroup may perceive themselves as being personally responsible for the safety of their ingroup. These members could additionally possess a strong tendency for hypervigilance toward identifying potential threats and instils a high level of self-sacrificing prosociality. Such members who may also engage in strong retaliatory thinking could perceive the outgroup as a possible threat, become highly willing to self-sacrifice their personal resources to harm the outgroup than to exclusively boost the welfare of their ingroup, even when there is no clear and explicit threat from the outgroup. This observation further implied that highly self-sacrificing members with retaliatory thinking may also hold strong anticipations of hostility from the outgroup, even from a non-threatening outgroup, and willingly contribute their personal resources to solely harm the outgroup relative to solely enhancing ingroup welfare.

5. CHAPTER 5: ASSESSING THE MODERATING EFFECT OF ANTICIPATED OUTGROUP HOSTILITY ON THE POSITIVE ASSOCIATION BETWEEN SELF-SACRIFICING PROSOCIALITY AND OUTGROUP AGGRESSION

5.1. Anticipations of outgroup hostility moderate the association between self-sacrificing prosociality and outgroup harm

“The greater the threat, the greater is the risk of inaction – and the more compelling the case for taking anticipatory action to defend ourselves, even if uncertainty remains...” (The White House, 2002). The U.S. government continues to apply this enduring principle to protect its people and interests, and positioned itself to use all instruments of national power before the threats wreak grave damage. In like vein, highly self-sacrificing individuals tend to be constantly alert and quick in sensing cues that are representative of dangers to the ingroup. Anticipating potential harm, such members may willingly incur personal costs to confront the threat source. To highly self-sacrificing members in an intergroup setting, the mere presence of an outgroup with unclear intent and action could be construed as a suspect occurrence and may potentially be threatening for the ingroup.

Attributions of the outgroup as being potentially dangerous could be guided by the motive attributional asymmetry which assumes that outgroup actions of aggression are motivated by hatred toward the ingroup while ingroup actions of aggression are motivated by care and compassion for the ingroup (Waytz et al., 2015). Individuals with strong self-sacrificing prosociality may develop anticipations of outgroup hostility, and may consequently engage in self-sacrificial behaviours that harm and eliminate the outgroup. Such outgroup

aggression would be reasoned as necessary to reduce the threat, in contrast to only increasing the instrumental benefits for the well-being of the ingroup, which may not guarantee the group is safe from the actions of threatening outgroup (Jonas et al., 2014; Neuberg & Schaller, 2015).

Employing real group identities, Sheikh et al. (2016) found that, in the condition where there was no actual threat of implementation of the Sharia law and rejection of liberal democracy in Spain, Spanish participants who were strongly fused with their country were nonetheless willing to make costly sacrifices to defend the values of democracy, at a similar level to participants who were actually exposed to such threats. Using a minimal group paradigm, Cacault et al. (2015) showed that ingroup members voluntarily contributed to intentionally aggress against an inferior outgroup in the absence of prior conflict with outgroups despite being “fully aware of the negative consequences for the outgroup” (pp. 7). The purpose of this study thus aimed to test if anticipated aggression from outgroups would be a mediator of whether individuals with high self-sacrificing prosociality for the ingroup would make contributions to solely harm outgroup harm relative to promoting the welfare of the ingroup and outgroup through general/universal prosociality.

5.2. Study hypotheses

There were two hypotheses that were developed and tested in Study 3.

Hypothesis 1: *Self-sacrificing prosociality towards one's ingroup in intragroup contexts will be positively associated with aggression towards the outgroup in intergroup contexts.*

Individuals who are fused to their group may possess strong sensitivity to detect potential threats to their group and could become most willing to volunteer to remove the threat which would protect their members. Aligning with the identity fusion theory, in an intergroup context, strongly self-sacrificing members could develop high threat sensitivity in which they become wary of the presence, intent, and actions of the outgroup even when threat from the outgroup is absent. Consequently, such anticipations of outgroup hostility may motivate members would willingly sacrifice their individual resources to aggress against the outgroup than to solely and tangibly increase instrumental benefits for ingroup well-being.

Hypothesis 3: Anticipations of hostility from the outgroup will mediate the relationship between self-sacrificing prosociality towards one's ingroup in intragroup contexts and aggression towards the outgroup in intergroup contexts.

5.3. Method

5.3.1. Participants

One hundred and six students from Nanyang Technological University participated in this study in exchange for either course credits or monetary payments (71.7% female; $M_{\text{age}} = 20.85$ years, $SD_{\text{age}} = 1.99$). Each participant was randomly assigned to a five-member group. To ensure that participants playing these games individually in this online survey responded and behaved as if they were part of a group, participants were informed that they were seated amongst members of their group, and that decisions made by each member in the group will be integrated together in real-time. Each five-member group was

randomly matched to two other groups using an online research randomizer tool. An a priori power analysis (G*Power version 3.1.9; Buchner et al., 2014) based on hierarchical linear regression to test the moderation model indicated that, with a medium effect size of .15, an α -level of .05, a power level of .80, and a total of 3 predictors, a minimum of 77 participants would be required in this study.

5.3.2. Study design

A within-subjects design was employed in this experiment. The VoD game and the IPD-MD+C game were adapted to this study. The participants played nine rounds of the VoD game followed by two rounds of the IPD-MD+C game. This study employed unpleasant noise blasts to increase the realism of the punitive and harmful outcomes in the two decision-making (VoD and IPD-MD+C) games and to prompt self-sacrificing prosociality and outgroup aggression at a behavioural level. Aversive noise stimuli have demonstrated to be potentially effective and valid assessments of aggression (Elson et al., 2014). For instance, Bushman et al. (2007) used aversive noise blasts to measure aggressive behaviours of university students who either read a story about scriptural violence or a neutral passage. Students who read about scriptural violence were found to be more aggressive to their opponents as they administered louder and longer noise blasts, compared to the control group. This study utilized a behavioural decision-making task which required participants to play the games with others with the impression that their decisions would have real stakes and consequences that could have harmful effects on others. Unlike studies that may employ abstract monetary or point system gains/losses, participants were

required to make decisions that would ostensibly cause actual physical harm to the outgroup and/or their ingroup. The nature of this measure allowed members with self-sacrificing prosociality to distinctly demonstrate behaviours that hurt the outgroup compared to helping own ingroup members. This measure would approximate concrete behaviours of self-sacrificing prosociality more closely and can leave little room for subjective comparisons. Compared to Studies 1 and 2, a potential advantage of this study was that participants were tested in a laboratory-based setting rather than online samples on MTurk survey platforms.

Self-sacrificing prosociality was measured as the total number of times the participant volunteered in all nine rounds. From the nine rounds, the VoD 10-3 round was selected as a key round of self-sacrificing prosociality as the member who volunteered would be required to hear 10 seconds of aversive noise so as to avert other ingroup members from hearing three seconds of the same noise. The motive to allocate the harm from the aversive noise to ingroup members was measured by the mean number of seconds each member allotted to pool A. The motive to distribute the harm from the aversive noise evenly to both the ingroup and outgroup was measured by the mean number of seconds each member allotted to pool B. The competitive motive to only cause harm to the outgroup was measured as the mean number of seconds contributed to pool C. Participants were additionally given the option to keep the seconds of aversive noise for themselves to hear and not contribute to any pool.

5.3.3. Measures

VoD game. The VoD game (Goree et al., 2017) was used to measure self-sacrificing prosociality. In the present version of the VoD game, participants

were required to either volunteer to hear an aversive noise for a specified time duration (in seconds) on behalf of their ingroup or, to not volunteer to hear the aversive noise. The group member who volunteered will be the only member to hear an aversive noise for a specified time duration, while the other four group members benefit by not hearing the aversive noise for the specified time duration. If more than one member volunteered, there would be no additional benefit for all members in the group. If no one in the group volunteered to hear, all members in the group will be required to individually hear the aversive noise for a specified time duration. The cost of volunteering, which refers to the specified time duration that the member who volunteered will hear the aversive noise, and the cost to group if no member volunteered, which was the specified time duration that each member will hear the aversive noise if there was no volunteer, varied at three levels – three, five, and ten seconds.

This arrangement formed a 3 x 3 matrix with nine cells that were utilized as game rounds, similar to the VoD game structures used in Studies 1 and 2. For example, in the first cell, the time duration for a member who volunteered to hear the aversive noise was three seconds and the time duration that would be given to each member if there was no volunteer was three seconds. In the ninth cell, the time duration for a member who volunteered to hear the aversive noise was ten seconds and the time duration that would be given to each member if there was no volunteer was ten seconds. Participants played each round with a new endowment of 0 seconds. Self-sacrificing prosociality was measured as the total number of times each player volunteered in all nine rounds. From the nine rounds, the VoD 10-3 round was selected as a key round of self-sacrificing

prosociality. Figure 15 shows a round in the modified Volunteer's dilemma game.

In this round, the **duration of noise to hear is 10 seconds**.

If a member volunteers, only he (or she) will hear the noise for 10 seconds.

If at least one member in your group volunteers to hear the noise for 10 seconds, then the other members who did not volunteer will not be required to hear the noise.

But, if NO ONE volunteers, all 5 members in your group including yourself, will be required to hear the noise for 5 seconds.

Do you choose to:

VOLUNTEER (You will hear the noise for 10 seconds even if another member volunteers)

REFRAIN (You will not hear the noise if another member volunteers)

Figure 15. A round in the modified Volunteer's dilemma game.

Expectations of other members to volunteer in the VoD game. After participants indicated their decision to volunteer or refrain in each round of the VoD game, they were asked to rate how likely their fellow members would volunteer in that round. Participants who volunteered were asked “*How likely do you think other members will volunteer?*”. For participants who refrained, they were asked “*When making my decision to keep, I assumed other players will volunteer their points*”. Both items were measured using a 7-point Likert scale ranging from 1 (*Not at all*) to 7 (*Very much*). For each round, the two items were merged into a variable that represented the expectation of other members to volunteer.

IPD-MD+C game. The IPD-MD+C game was used to measure the motives for ingroup love and outgroup hate. There were two rounds of this IPD-MD+C game which corresponded to the two severity levels of outgroup threat. Participants were told that, in each round, their group will play against a new five-member group and that each member in both groups will receive an individual pool of 10 seconds of the aversive noise that they could either allot or keep. Each participant was asked to decide how much of the 10 seconds of noise to keep for oneself, and how much to allot to pools A, B, and C.

Every one second of noise allotted to pool A would be doubled and evenly split among all five ingroup members, including the member who allotted the seconds. Allotments to pool A can potentially reflect an anti-social response or an act of defection, as unwanted harm is preferred to be distributed among the ingroup which allows the member who allotted to receive reduced harm. Allocating one second of noise to pool B would increase one second of noise for the outgroup members. Additionally, one second of noise would be given to the ingroup and evenly shared among the five members, including the member who allotted the second(s). The role of pool B was to function as a strategy that evenly distributes the seconds of aversive noise to hear to the members in the ingroup and outgroup. Allotments to pool C indicated intentions to aggress against and cause actual harm to outgroup members. Every one second of noise allotted to pool C would be doubled and distributed to the outgroup to hear.

In contrast to pool B, the doubled seconds were not distributed to the group that allotted to pool C. Aside from the three pools, members were given the option to keep their 10 seconds for themselves to hear and not contribute to

any of the three pools. The contributions to the Self pool in this study may indicate a prosocial motive, as the seconds of noise are not allocated to members in one's ingroup or to the outgroup. In the Self pool, the seconds of aversive noise that one retains for him- or herself to hear could suggest the avoidance to harm the ingroup and the outgroup and may signal self-sacrificing prosociality (i.e., universal prosociality (Aaldering & Böhm, 2020)). Allotments to the Self pool were hence controlled for in all analyses. Participants were informed that, at the end of the experiment, they would be required to hear the noise for the duration they had accrued based on their decisions and their group members' decisions in the two games.

The outgroup threat levels, which comprised of the *absence* and *presence of outgroup threat*, formed the two IPD-MD+C rounds in this study. Before making their allocations, participants were first shown the predetermined allocations of each outgroup member. In the absence of threat level, outgroup members were portrayed as making allotments only to pool A. In the presence of threat level, outgroup members were portrayed as making allotments mostly to pool B and moderately to pool A, and minimally to pool C. Large contributions to pool C would likely be inferred as an overt and substantial threat from the outgroup, which most certainly could evoke retaliatory aggressive responses from ingroup members including those who may not be highly self-sacrificing toward the ingroup and strongly anticipate hostility from the outgroup.

In this situation where the outgroup would be depicted as extremely aggressive, anticipations of outgroup group hostility may not be activated as the presence and magnitude of outgroup threat are clearly evident. Portraying

outgroup members as making large contributions to pool C to serve as a strong presence of outgroup threat was thus excluded in this study as the condition may not discriminate members with strong self-sacrificing prosociality and anticipations of outgroup hostility, from their counterparts. The study was focused on comparing the absence and presence of outgroup threat levels, to determine whether highly self-sacrificing members would discriminate between perceived and actual intergroup conflict. Figure 16 shows a round in the modified IPD-MD+C game.

Group 1 has decided to allot 25 seconds to increase the noise duration for your group.

The pool allocations of Group 1 are as follows:

	Member 1	Member 2	Member 3	Member 4	Member 5	Total Contributions (by Pool)
Pool A allocation	2	4	0	3	3	12
Pool B allocation	4	3	5	4	3	19
Pool C allocation	0	1	1	0	1	3

Based on Group 1's allocations to Pools B and C, the noise duration for your group will increase by:
 19 (from Pool B) + (3×2) (from Pool C) = 25 seconds

Group 1's Pools B and C contributions divided equally among your group:
 $25 \text{ seconds} / 5 = 5 \text{ seconds}$

Thus, as a result of Group 1's allocations, **each member in your group will be required to hear the noise for 5 seconds.**

How many seconds would you ALLOT to the 3 Pools in your group?

The allocations you make to the three Pools and the allocations you keep for yourself, must total to 10.

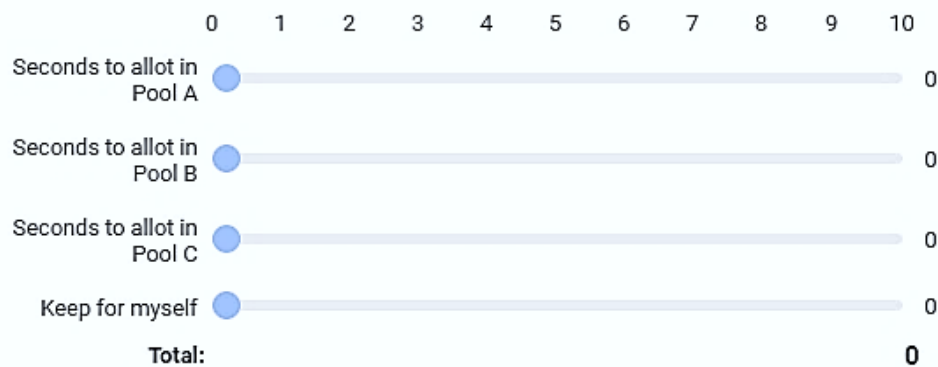


Figure 16. A round in the modified IPD-MD+C game.

Anticipations of outgroup hostility. Before each IPD-MD+C round where participants were shown the predetermined allotments of outgroup members and were allowed to make their allotments, they were asked to indicate how

much outgroup members, as a whole group, may have kept for themselves and allotted to the three pools. Anticipations of outgroup hostility was measured using participants' allotments to pool C. Figure 17 shows the measure of anticipated outgroup hostility in the modified IPD-MD+C game.

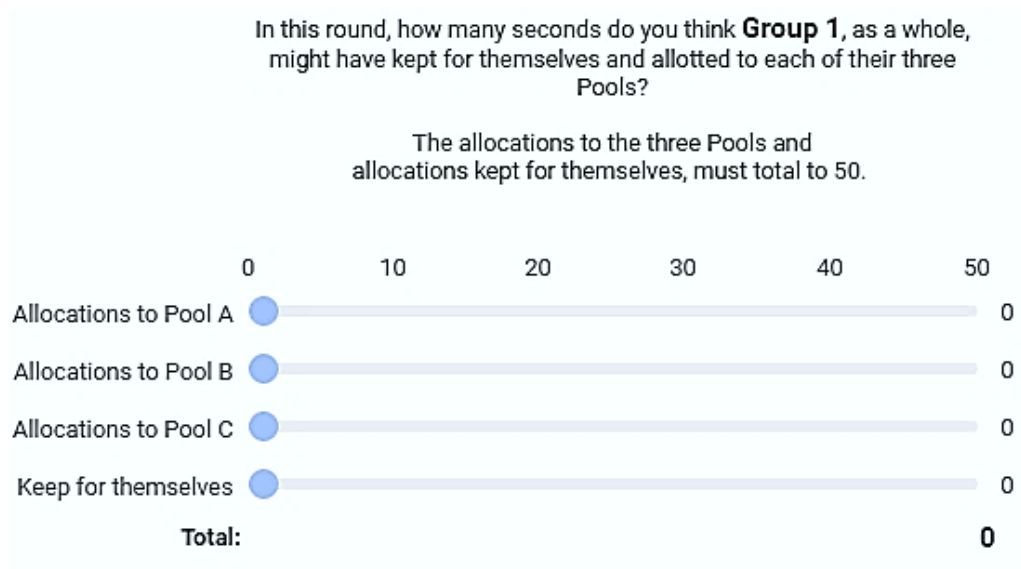


Figure 17. Measure of anticipated outgroup hostility in the modified IPD-MD+C game.

Motives of IPD-MD+C pool allotments. At the end of the IPD-MD+C game, participants were asked to rate two items about their motives to contribute using a 7-point Likert scale from 1 (*not at all*) to 7 (*very much*). The first item was focused on the intention to harm the other group (“*When making my decision, I wanted to increase the noise duration of the other group*”). The second item was focused on the intention to help the ingroup (“*When making my decision, I wanted to help my group members by minimizing the noise duration we had to hear*”). Higher scores indicated stronger motivation for the intention underlying their pool contributions.

Motive expectations of IPD-MD+C pool allotments by the outgroup.

Following the items on motives of their pool allotments, participants answered two items about the motives of pool allotments that were made by outgroup members. The items were “*I expected members of the other group to minimize the noise duration for themselves*” and “*I expected members of the other group to increase the noise duration for my group*”. The two items were controlled for, as self-sacrificing members would be presumed to anticipate hostility from the outgroup regardless of any intention and action undertaken by the outgroup.

5.3.4. Procedure

Each experimental session was conducted with a group of 15 participants. Upon arrival, every participant was directed to an individual computer cubicle and was asked to read and sign the informed consent form. Participants were presented a brief overview of the session. They were informed that they were randomly assigned to a five-member group and that they would play two decision-making games which required them to hear an aversive noise for specified time durations. They were provided with headphones to listen to a 30-second sample of the noise and were asked to rate the pleasantness of the noise. Participants were informed that, at the end of the experiment, they would be brought to another laboratory to hear the noise for the time duration they had accrued based on their decisions and their group members’ decisions in the two games. They were told that the decisions were collected and interpreted using real-time analytics. There was no feedback or communication among the participants throughout the session. After the overview, participants began the decision-making games on their computers. They read the game instructions

and were asked to answer a short quiz about the game rules, before playing each game. After completing the two games, participants responded to the expectation items and demographic measures. Once participants completed the measures, they informed the experimenters and were debriefed about the study.

5.4. Results

5.4.1. Manipulation checks

Participants rated the noise on how annoying, pleasant, painful, and uncomfortable it sounded, on a 5-point Likert scale of 1 (*strongly disagree*) to 5 (*strongly agree*). After reverse-coding the item on pleasantness of the noise, the four variables were combined into a composite ($\alpha = .83$). The mean of this composite was 4.12 ($SD = .87$), indicating participants rated the noise to be aversive. A funnelled debriefing procedure that narrowed from broad to specific questions about the study was utilized to check participant awareness of the hypothesis and manipulations. Participants were first queried about the broad aims of the study. Approximately 9.4% of all participants ($n = 10$) guessed that the aims of the study focused on decision-making based on ingroup and outgroup memberships. When asked about aspects of the study that appeared odd or strange, none of the participants spontaneously expressed suspicions on whether they were playing with other people in real groups and being required to hear the aversive noise for the accumulated duration at the end of the study session.

Participants' understanding of the VoD game rules averaged at 4.91 ($SD = 1.03$) and their understanding of the IPD-MD+C game rules averaged at 3.27 ($SD = 1.18$), on a 6-point Likert scale of 1 (*strongly disagree to understanding*)

to 6 (*strongly agree to understanding*). The mean VoD quiz score was 3.67 ($SD = .80$), where a maximum score of 4 indicate all correct answers to the four questions. The mean IPD-MD quiz score was 2.17 ($SD = .87$), where a maximum score of 3 indicate all correct answers to the three questions.

5.4.2. Correlations between self-sacrificing prosociality and mean pool contributions

The skewness value of totalled self-sacrificing prosociality variable was .407 which was within ± 1.00 criterion, as recommended by Meyers et al. (2013). Correlation results indicated that there were moderate associations between self-sacrificing prosociality in the VoD game and contributions to the three pools in the IPD-MD+C game, $r_s(106) < .40, p_s < .01$. Table 6 presents the correlations between self-sacrificing prosociality (summed across all VoD rounds) and mean contributions to pool A (ingroup harm), pool B (ingroup harm and outgroup harm), pool C (outgroup harm), and Self pool in Study 3.

Table 6

Correlation coefficients of total self-sacrificing prosociality across the VoD game and mean pool contributions in the IPD-MD+C game.

	1	2	3	4	5
1. Self-sacrificing prosociality	1				
2. Ingroup harm (Mean Pool A contributions)	.08	1			

3. Parochial altruism					
(Mean Pool B contributions)		-.15	.04		1
4. Outgroup harm					
(Mean Pool C contributions)		-.32**	-.44***	-.33**	1
5. Mean Self pool contributions					
		.40***	-.16	-.29**	-.63***

* $p \leq .05$, ** $p \leq .01$, *** $p \leq .001$.

5.4.3. Means comparisons of VoD game and IPD-MD+C game

Means comparisons of the volunteering rate in the VoD game. The volunteering rate in the VoD game, which represented mean self-sacrificing prosociality, averaged at 3.86 ($SD = 2.46$) across all nine rounds. A two-way repeated-measures ANOVA was conducted to compare the effect of cost to self and the effect of cost to group if no member volunteered, on the willingness to volunteer. The expectations that group members will volunteer for all rounds were included as a covariate. The purpose of this analysis was to determine how different costs to oneself and to the group across the VoD game may affect self-sacrificing prosociality. There were significant main effect for cost to self for volunteering, $F(2, 208) = 10.03, p < .001$, and for cost to the group if no member volunteered, $F(2, 208) = 4.45, p < .01$. Participants volunteered significantly more when the cost of volunteering to self was three seconds ($M = .60, SD = .04$), than five ($M = .44, SD = .03$) and ten seconds ($M = .25, SD = .03$). Participants volunteered significantly more when the cost to the group if

no member volunteered was ten seconds ($M = .54, SD = .03$), than three seconds ($M = .33, SD = .03$) and five seconds ($M = .43, SD = .03$). There was a significant interaction effect for cost to self for volunteering and for cost to the group if no member volunteered, $F(4, 416) = 2.63, p = .03$. When the cost of volunteering to self was three seconds, participants volunteered significantly more when the cost to the group was 10 seconds ($M = .72, SD = .04$), than five seconds ($M = .59, SD = .05$) and three seconds ($M = .48, SD = .05$). When the cost of volunteering to self was five seconds, participants volunteered significantly more when the cost to the group was 10 seconds ($M = .58, SD = .05$), than five seconds ($M = .43, SD = .05$) and three seconds ($M = .30, SD = .05$). When the cost of volunteering to self was ten seconds, participants volunteered significantly more when the cost to the group was 10 seconds ($M = .31, SD = .04$), than five seconds ($M = .25, SD = .04$) and three seconds ($M = .20, SD = .04$). The means of the volunteering rate based on the varied costs to self and the group differed significantly from one another, $p_s < .05$, and are presented in Figure 18.

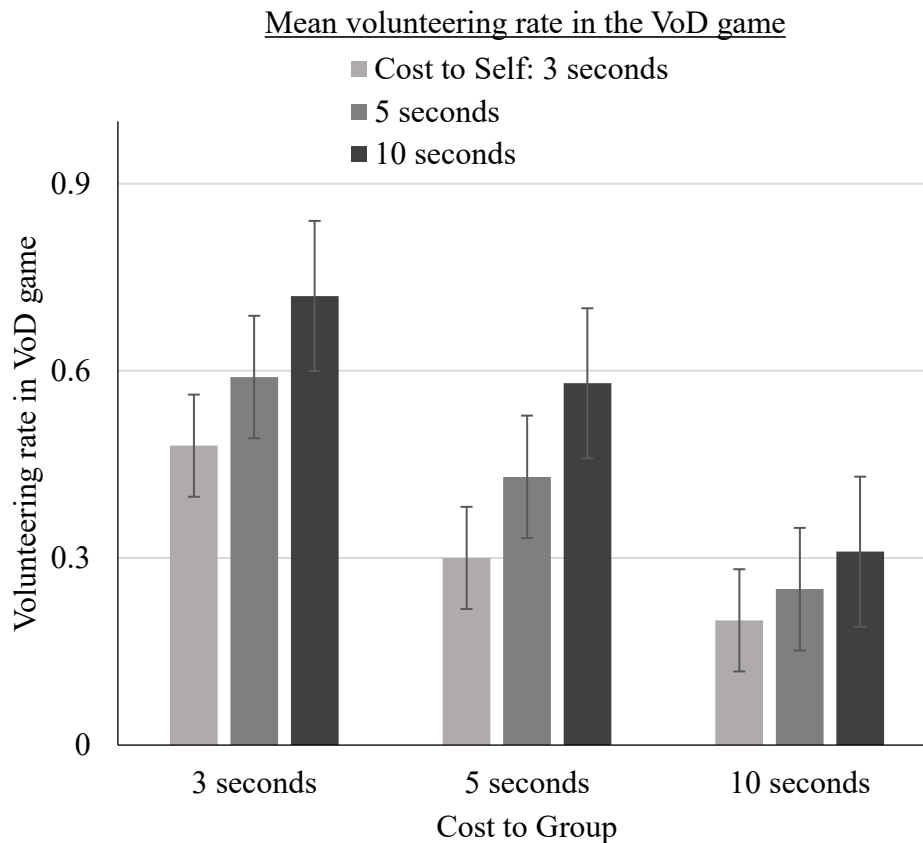


Figure 18. Mean volunteering rate based on costs to self and the group in the VoD game. The error bars represent standard errors.

Means comparisons of pool allotments in the IPD-MD+C game. Across the two rounds in the IPD-MD+C game, participants contributed an average of 1.73 seconds to pool A ($SD = 1.89$), 1.88 seconds to pool B ($SD = 1.87$), 3.69 seconds to pool C ($SD = 3.33$), and kept 2.70 seconds for themselves ($SD = 2.96$). A two-way repeated-measures ANOVA was conducted to compare the effect of pool type (A, B, and C) and the effect of outgroup threat severity (absence and presence of outgroup threat), on the number of seconds contributed. The mean seconds kept for oneself in the two rounds of the IPD-MD+C game and the two motive expectations of the outgroup to minimize harm for themselves and maximize harm for the opposing group were

controlled for. The purpose of this analysis was to identify how different levels of outgroup threat might affect contributions toward ingroup harm and outgroup harm. There was no significant main effect of outgroup threat severity, $F(1, 102) = .50, p = .48$. There was no significant main effect for pool type, $F(2, 204) = 1.60, p = .21$. Pairwise comparisons showed that pool C contributions ($M = 3.70, SD = .24$) differed significantly from pool B ($M = 1.88, SD = .17$) and pool A ($M = 1.73, SD = .18$) allotments, $p_s < .001$. There was no significant interaction effect for pool type and outgroup threat severity, $F(2, 204) = 2.41, p = .09$.

Means comparisons of pool allotments including Self pool as a dependent variable. A two-way repeated-measures ANOVA was conducted to compare the effect of pool type (A, B, C, and Self) and the effect of outgroup threat severity (absence and presence of outgroup threat), on the number of seconds contributed. The two motive expectations of the outgroup to minimize harm for themselves and maximize harm for the opposing group were controlled for. The purpose of this analysis was to identify how different levels of outgroup threat might affect contributions toward general prosociality, ingroup harm, and outgroup harm. There was a significant main effect for pool type, $F(3, 309) = 3.83, p = .01$. There was no significant interaction effect for pool type and outgroup threat severity, $F(3, 309) = 1.81, p = .15$. Pairwise comparisons showed that there was a significant difference between the Self pools in the absence ($M = 3.40, SD = 3.58$) and presence ($M = 2.00, SD = 2.86$) of outgroup threat, $p < .001$ (see Figure 19). Expectedly, the presence of outgroup threat led to increased outgroup aggression in pool C allotments, compared to the absence of outgroup threat. However, there were lower allotments to the Self pool in the

presence of outgroup threat, suggestive of decreased general/universal prosociality in which individuals may become more self-protective and less cooperative and altruistic toward members in the ingroup and outgroup. This finding could imply that, in the presence of outgroup threat, individuals with general prosocial motives toward the ingroup and the outgroup may have kept fewer seconds of noise for themselves (i.e., lower allotments to the Self pool) in order to allot seconds of noise to support the motive for outgroup aggression.

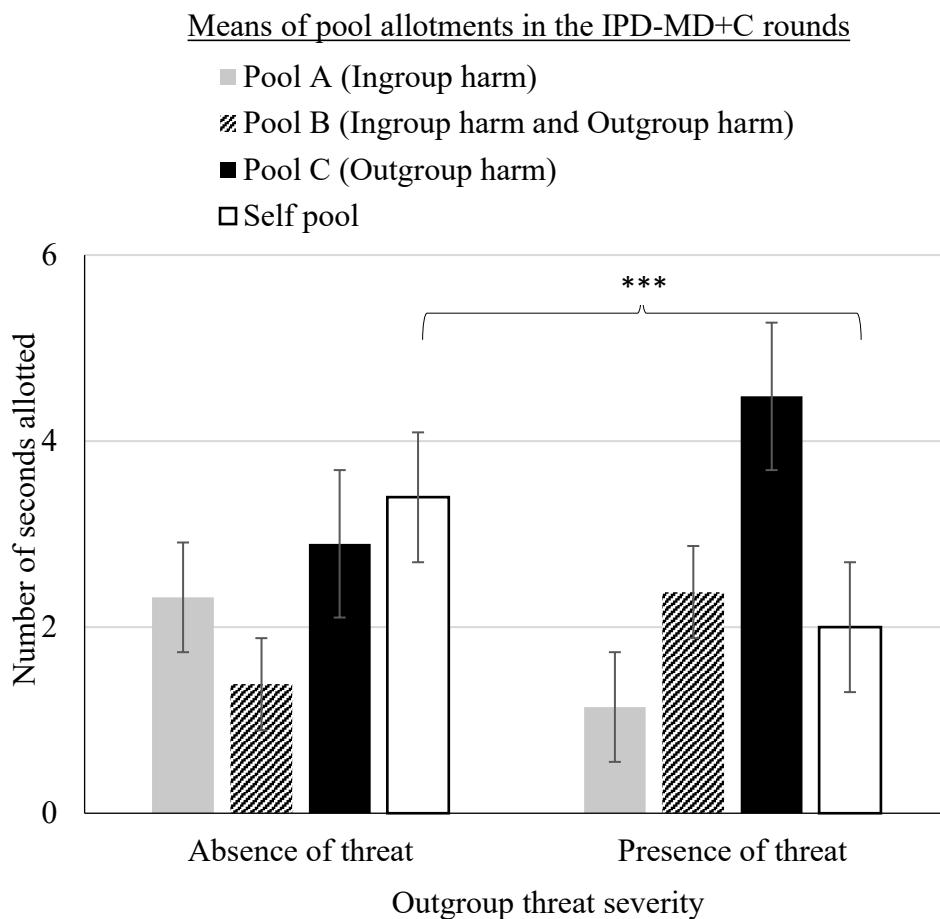


Figure 19. Mean pool allotments in the absence and presence of outgroup threat. The error bars represent standard errors. $*p \leq .05$, $**p \leq .01$, $***p \leq .001$.

5.4.4. Linear regression analyses testing the effect of self-sacrificing prosociality on outgroup harm

Linear regression analyses were utilized to examine Hypothesis 1 which posited whether self-sacrificing prosociality in intragroup contexts was predictive of outgroup harm in intergroup contexts. There were two measures of self-sacrificing prosociality selected as predictors for these analyses. The first measure was the continuous variable of self-sacrificing prosociality based on the total number of times the participant volunteered in the VoD game. The second measure was the categorical variable of self-sacrificing prosociality based on the VoD 10-3 round. The purpose of this analysis was to establish whether self-sacrificing prosociality in intragroup contexts would predict outgroup harm in intergroup contexts.

Self-sacrificing prosociality (based on all VoD rounds) and mean outgroup harm. Self-sacrificing prosociality (based on all VoD rounds) was submitted as the independent variable and mean pool C contributions (outgroup harm) across the IPD-MD+C game rounds were utilized as the dependent variable. The mean expectation that other members would contribute in the VoD game rounds was controlled for by submitting this variable as a covariate in this analysis. The mean number of seconds in the Self pool which could be kept for oneself to hear was also included as a covariate. Unlike Studies 1 and 2, the Self pool in this study could represent general/universal prosociality toward the ingroup and outgroup and hence, was controlled for. The overall model was significant, $R^2 = .39$, $F(3, 102) = 23.37$, $p < .001$. Self-sacrificing prosociality did not predict mean pool C allotments, $\beta = -.10$, $t(102) = -.86$, $p = .39$, indicating that there was no relationship between self-sacrificing

prosociality toward their group and outgroup harm across the outgroup threat levels.

Self-sacrificing prosociality (based on all VoD rounds) and outgroup harm in the absence of outgroup threat. Self-sacrificing prosociality (based on all VoD rounds) was submitted as the independent variable and pool C contributions (outgroup harm) in the absence of outgroup threat were utilized as the dependent variable. The mean expectation that other members would contribute in the VoD game rounds was controlled for by submitting this variable as a covariate in this analysis. The Self pool which the seconds could be kept for oneself to hear was included as a covariate. The overall model was significant, $R^2 = .38$, $F(3, 102) = 22.55$, $p < .001$. Self-sacrificing prosociality did not predict allocations to pool C in the absence of outgroup threat, $\beta = -.04$, $t(102) = -.34$, $p = .74$, indicating that there was no relationship between self-sacrificing prosociality toward their group and outgroup harm even when members in the outgroup were portrayed as making allocations only to their group's pool A which did not involve direct aggression to the ingroup (see Table 7). Self-sacrificing prosociality did not significantly predict mean contributions to pools A and B, as well as to each pool in the absence of presence of outgroup threat, $p_s < .74$. Hypothesis 1, which predicted that self-sacrificing prosociality towards one's ingroup will be positively associated with aggression towards the outgroup, was not supported.

Table 7

Regression coefficients of mean self-sacrificing prosociality (SSP) across all Volunteer's dilemma rounds as a predictor of pool contributions

	Ingroup harm (Pool A allocations)		Ingroup harm and Outgroup harm (Pool B allocations)		Outgroup harm (Pool C allocations)	
	B (S.E)	β	B (S.E)	β	B (S.E)	β
Across two outgroup threat levels						
SSP	.12 (.08)	.15	-.02 (.08)	-.02	-.10 (.11)	-.07
<i>F</i>	2.35		3.46*		23.37***	
<i>R</i> ²	.07		.09		.41	
Absence of outgroup threat						
SSP	.14 (.12)	.12	-.09 (.09)	-.11	-.04 (.13)	-.03
<i>F</i>	1.95		4.75**		22.56***	
<i>R</i> ²	.05		.12		.40	
Presence of outgroup threat						
SSP	.09 (.07)	.14	.06 (.11)	.06	-.15 (.13)	-.10
<i>F</i>	2.00		1.69		19.68***	
<i>R</i> ²	.06		.05		.37	

* $p \leq .05$, ** $p \leq .01$, *** $p \leq .001$.

Self-sacrificing prosociality (based on all VoD rounds) and mean difference score for outgroup harm. A difference score for 'pure' outgroup aggression was computed by first summing mean contributions to pools B and C and subtracting mean contributions to pool A from the summed contributions.

Self-sacrificing prosociality (based on all VoD rounds) was submitted as the independent variable while the difference score was utilized as the dependent variable. The mean expectation that other members would contribute in the VoD game rounds was controlled for by submitting this variable as a covariate in this analysis. The overall model was significant, $R^2 = .12$, $F(2, 103) = 6.99$, $p = .001$. Self-sacrificing prosociality predicted outgroup aggression based on the difference score in a reverse direction, $\beta = -.57$, $t(103) = -3.42$, $p = .001$, after controlling for the expectation that other members will volunteer in the VoD game, $\beta = -.32$, $t(103) = -1.04$, $p = .30$, such that individuals with high self-sacrificing prosociality were less likely to contribute to outgroup aggression based on the difference score.

Self-sacrificing prosociality (based on all VoD rounds) and difference score for outgroup harm in the absence of outgroup threat. A difference score for 'pure' outgroup aggression was computed by first summing contributions to pools B and C in the round with no outgroup threat and subtracting contributions to pool A in the same round from the summed contributions. Self-sacrificing prosociality (based on all VoD rounds) was submitted as the independent variable while the difference score was utilized as the dependent variable. The mean expectation that other members would contribute in the VoD game rounds was controlled for by submitting this variable as a covariate in this analysis. The overall model was significant, $R^2 = .05$, $F(2, 103) = 3.49$, $p = .03$. Self-sacrificing prosociality significantly predicted outgroup aggression based on the difference score in the reverse direction, $\beta = -.59$, $t(103) = -2.47$, $p = .02$. after controlling for the expectation that other members will volunteer in the VoD game, $\beta = -.27$, $t(103) = -.62$, $p = .54$.

Self-sacrificing prosociality (based on VoD 10-3 round) and mean outgroup harm. Linear regression analyses were additionally performed using self-sacrificing prosociality as a categorical variable. Self-sacrificing prosociality (based on the VoD 10-3 round which involved the outcomes to either volunteer or refrain) was submitted as the independent variable and mean pool C contributions (based on averaged contributions for the two IPD-MD+C rounds) was utilized as the dependent variable. The seconds kept for oneself and expectation that other members would contribute in the VoD 10-3 round were controlled for by submitting these variables as covariates in this analysis. The overall model was significant, $R^2 = .41$, $F(3, 102) = 23.62$, $p < .001$. Self-sacrificing prosociality did not predict mean pool C contributions, $\beta = .16$, $t(102) = .25$, $p = .80$, such that there was no relationship between individuals who were more self-sacrificing toward their group and their inclinations to solely harm the outgroup (pool C) across outgroup threat levels. In addition, self-sacrificing prosociality did not predict mean pool B contributions, $p = .45$, and mean pool A contributions, $p = .70$.

Self-sacrificing prosociality (based on VoD 10-3 round) and outgroup harm in the absence of outgroup threat. Self-sacrificing prosociality (based on the VoD 10-3 round) was submitted as the independent variable and pool C contributions (based on the round with the absence of outgroup threat) was utilized as the dependent variable. The seconds kept for oneself and expectation that other members would contribute in the VoD 10-3 round were controlled for by submitting these variables as covariates in this analysis. The overall model was significant, $R^2 = .38$, $F(3, 102) = 22.70$, $p < .001$. Self-sacrificing prosociality did not predict pool C contributions in the absence of outgroup

threat, $\beta = .44$, $t(102) = .59$, $p = .55$, suggesting individuals who were highly self-sacrificing toward their group were not inclined to harm the outgroup. There were no significant effects of self-sacrificing prosociality on pools A and B contributions when there was no outgroup threat, $p_s > .19$.

Self-sacrificing prosociality (based on VoD 10-3 round) and difference scores for outgroup harm. A difference score for ‘pure’ outgroup aggression was computed by first summing contributions to pools B and C in the round with no outgroup threat and subtracting contributions to pool A in the same round from the summed contributions. Self-sacrificing prosociality (based on the VoD10-3 round) was submitted as the independent variable while the difference score was utilized as the dependent variable. The seconds kept for oneself and expectation that other members would contribute in the VoD 10-3 round were controlled for by submitting these variables as covariates in this analysis. The overall model was not significant, $R^2 = .03$, $F(2, 103) = .265$, $p = .08$. Self-sacrificing prosociality did not significantly predict outgroup aggression based on the difference score, $\beta = -1.59$, $t(103) = -1.48$, $p = .14$, after controlling for the expectation that other members will volunteer in the VoD game, $\beta = -.32$, $t(103) = -1.46$, $p = .15$. Similarly, self-sacrificing prosociality did not significantly predict outgroup harm based on the difference score in the round with no outgroup threat, $\beta = -1.67$, $t(103) = -1.10$, $p = .28$, after controlling for mean points kept for oneself and the expectation that other members will volunteer in the VoD game, $\beta = -.14$, $t(103) = -.44$, $p = .66$. There were no significant gender effects.⁵

⁵ Additional linear regression analyses with the continuous measure of self-sacrificing prosociality as the independent variable and mean contributions to pools A, B, and C as the dependent variables were conducted using expectation of other members to

5.4.5. Mediation analysis with anticipations of outgroup hostility as a mediator of the self-sacrificing prosociality – outgroup harm association

A mediational model was used to test Hypothesis 3 which predicted that anticipations of hostility from the outgroup will mediate the relationship between self-sacrificing prosociality towards one's ingroup and aggression towards the outgroup. The SPSS PROCESS script for Model 4 (Hayes, 2013) was employed in this mediational model. Anticipations of hostility from the outgroup (based on expectations of the outgroup's pool C allotments in the no threat IPD-MD+C round) was examined as a mediator of the relationship between self-sacrificing prosociality (based on all VoD rounds) and pool C contributions in the no threat IPD-MD+C round. The mean expectation that other members would volunteer in the VoD game was included as a covariate. The overall model with self-sacrificing prosociality as the predictor was not significant, $R^2 = .04$, $F(2, 103) = 2.11$, $p = .13$. Self-sacrificing prosociality did not significantly predict anticipations of outgroup hostility, $b = -.68$, $SE = .59$, $p = .25$, 95% C.I. [-1.85, .48]. The overall model with anticipations of outgroup hostility as the predictor was significant, $R^2 = .42$, $F(3, 102) = 24.65$, $p < .001$. Anticipations of outgroup hostility predicted contributions to pool C in the absence of outgroup threat while controlling for self-sacrificing prosociality, $b = .07$, $SE = .02$, $p = .001$, 95% C.I. [.03, .11]. A bootstrap estimation approach with 10,000 samples showed that the indirect effect of self-sacrificing

volunteer in the VoD game and gender as covariates. Self-sacrificing prosociality did not predict mean contributions to pools A and B, $p_s < .21$. Self-sacrificing prosociality did not predict mean contributions to pool C, $\beta = -.07$, $t(101) = -.60$, $p = .55$. Similar patterns of results were obtained when the dependent variables were pools A, B, and C contributions in the absence of outgroup threat as well as difference scores based across the rounds and in the round with the absence of outgroup threat. Comparable results for the effects of gender were observed when the categorical measure of self-sacrificing prosociality was used as the independent variable.

prosociality was not significant, $b = -.007$, $SE = .13$, 95% C.I. [-.27, .25].

Similarly, anticipations of outgroup hostility did not mediate the association between self-sacrificing prosociality and the outcome variables on pool C contribution when outgroup threat level was present as well as pools A and B contributions for each IPD-MD+C round. Hypothesis 3, which predicted that anticipations of outgroup hostility will mediate the relationship between self-sacrificing prosociality towards one's ingroup in intragroup contexts and aggression towards the outgroup in intergroup contexts, was not supported.

5.4.6. Moderation analysis with anticipations of outgroup hostility as a moderator of the self-sacrificing prosociality – outgroup harm association

Anticipations of outgroup hostility was tested as a moderator of the relationship between self-sacrificing prosociality and outgroup aggression in the absence of outgroup threat, as the hypothesized mediational relationship was not observed. Based on the design of this study, anticipations of outgroup hostility could encompass a moderating effect rather than a mediating effect, as self-sacrificing prosociality and anticipations of outgroup hostility could function independent of one another. In the IPD-MD+C game rounds for this study, participants were not provided with any information about the outgroup. The tendency to assume the outgroup as a threat to the ingroup could be indicative of an individual difference that relates to anticipations of potential harm from the outgroup. This individual difference on anticipations of potential harm from the outgroup would hence be independent of self-sacrificing prosociality and may function as a moderator owing to the methodological aspects in this study. This moderation

relationship was tested using the SPSS PROCESS script for Model 1 (Hayes, 2013). Self-sacrificing prosociality in the VoD 10-3 round was submitted as the independent variable, anticipations of outgroup hostility as the moderator, and pool C allotments in the absence of outgroup threat as the dependent variable. The seconds kept for oneself in the IPD-MD+C round when outgroup threat was absent, the expectation that other ingroup members would volunteer in the VoD 10-3 game round, and the motive expectations of the outgroup to minimize harm for themselves and maximize harm for the opposing group were controlled for. The overall moderation model was significant, $R^2 = .72$, $F(7, 98) = 14.83$, $p < .001$. Self-sacrificing prosociality did not significantly predict pool C allotments in the absence of outgroup threat, $b = -1.90$, $t(98) = -1.35$, $p = .18$. There was no significant effect of anticipations of outgroup hostility on pool C allotments when outgroup threat was absent, $b = .04$, $t(98) = 1.74$, $p = .09$. Anticipations of outgroup hostility significantly moderated the association between self-sacrificing prosociality and pool C allotments when outgroup threat was absent, $b = .10$, $t(98) = 2.02$, $p = .046$, 95% CI [.002, .206] (see Figure 20). At high levels of anticipations of outgroup hostility, members with high self-sacrificing prosociality were more likely to allot to pool C in the absence of outgroup threat, $b = .14$, $t(98) = 3.03$, $p = .003$. At low levels of anticipations of outgroup hostility, members with low self-sacrificing prosociality marginally likely to allot to pool C, $b = .04$, $t(98) = 1.74$, $p = .08$ (see Figure 21). Anticipations of outgroup hostility did not moderate the link between self-sacrificing prosociality and pool C allotments in the presence of outgroup threat, $p = .12$. There were no moderation effects observed for contributions to pools A and B under the absence and presence of outgroup

threat levels, $p_s < .86$. Anticipations of outgroup hostility did not moderate the link between self-sacrificing prosociality and Self pool allotments in the absence and presence of outgroup threat while controlling for the two motive expectations of the outgroups, $p_s < .98$.

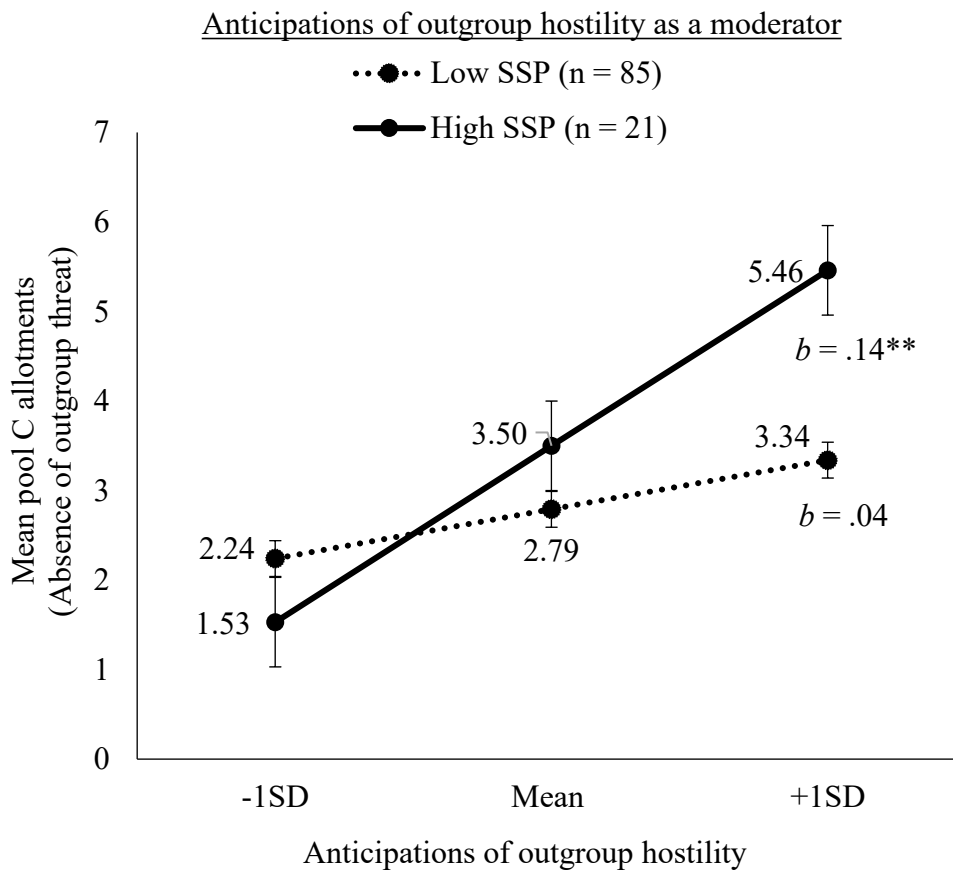


Figure 20. Anticipations of outgroup hostility moderating the association between self-sacrificing prosociality and pool C allotments (outgroup harm) in the absence of outgroup threat. The error bars represent standard deviations.

* $p \leq .05$, ** $p \leq .01$, *** $p \leq .001$.

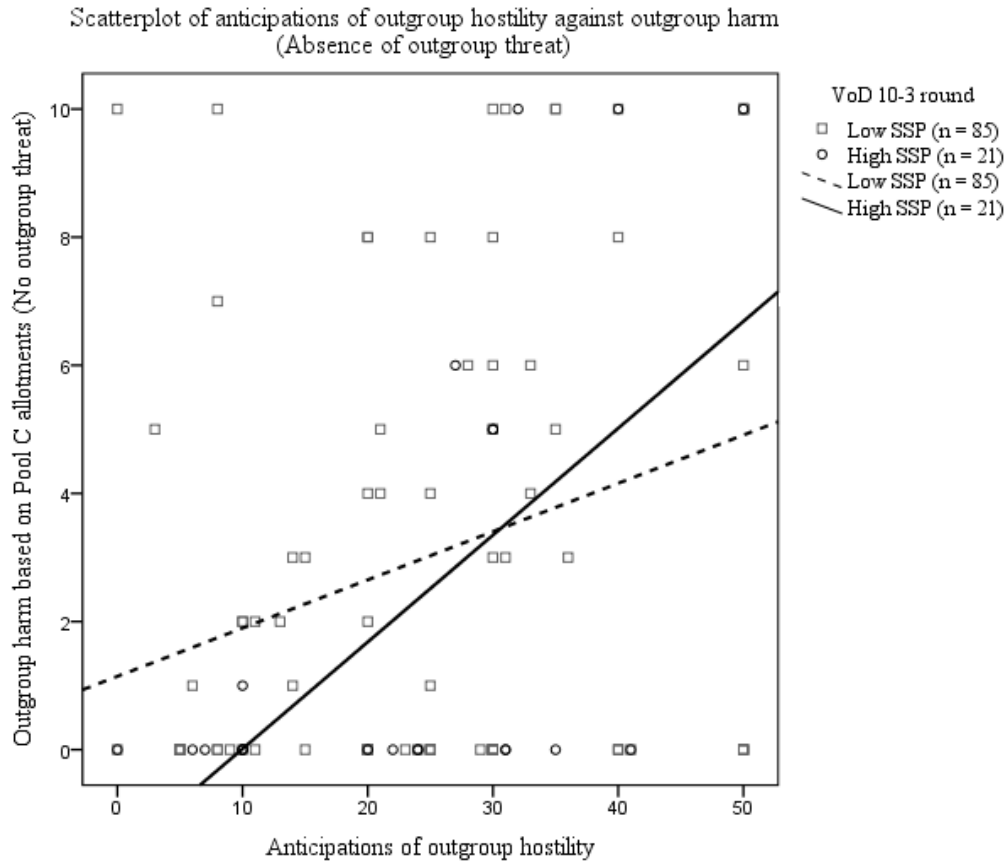


Figure 21. Scatterplot of anticipations of outgroup hostility correlated against pool C allocations (outgroup harm) in the absence of outgroup threat and with trendlines based on individuals with low and high self-sacrificing prosociality (SSP) in the VoD 10-3 round.

5.5. Discussion

This study hypothesized that self-sacrificing prosociality in intragroup contexts would predict outgroup harm in intergroup contexts. Findings did not support the hypothesis based on the mean pool allotments and difference scores analyses. Participants may have been generally prosocial toward the ingroup and outgroup. Participants with high self-sacrificing prosociality were found to have allotted consistently to pool C in the absence and presence of outgroup

threats, indicating such members with this inclination may not discriminate between perceived and actual intergroup conflicts. The findings of this study demonstrated the moderating effect of anticipated hostility from the outgroup on the hypothesized relationship between self-sacrificing prosociality towards one's ingroup and outgroup aggression. Owing to the methodological design of the study, anticipated outgroup hostility functioned as a moderator of the proposed relationship. Among individuals with strong anticipations of outgroup hostility, self-sacrificing prosociality predicted the behavioural intent to solely cause harm to the outgroup through pool C allotments relative to the behavioural intent to harm the ingroup via pool A allotments even when the outgroup did not pose a direct threat to the ingroup, compared to the presence of threat from the outgroup.

Though situations with salient threats from the outgroup may instigate even members with minimal levels of self-sacrificing prosociality to aggress, it is noteworthy that this study showed the relationship between self-sacrificing prosociality and outgroup aggression was pronounced only in the absence of outgroup threat, for individuals with strong anticipations of outgroup hostility. In situations where the outgroup threat is real, clear, and overt, most members with across all levels of commitment and self-sacrificing prosociality toward the ingroup would most likely retaliate against the outgroup, as they would not need to expect antagonism from the outgroup, suggesting that anticipations of outgroup hostility may not be relevant in such situations. Highly self-sacrificing individuals who also anticipate outgroup hostility could thus be most sensitive to situations involving the mere presence of an outgroup with unclear intent and actions, actuating self-sacrificial actions to aggress against the outgroup, even

when it may not pose as a danger. The design of Study 3 could not be used to test the predictions of the parochial altruism and bounded generalized reciprocity theory as the allocations to pool C which would harm the outgroup could be chosen as the most efficient option to maximise intergroup difference and increase instrumental ingroup welfare. Hence, the predictions derived from the CSA framework and the two alternative theories may not be disentangled as the findings of this study showed that self-sacrificing prosociality was associated with increased outgroup aggression.

5.6. Limitations

As observed in Studies 1 and 2, a constant limitation was the unequal sample sizes of members with low and high self-sacrificing prosociality, but the tendency to self-sacrifice for the group could be an extreme and voluntary behaviour that is emitted by a small number of group members (Swann et al., 2014). The second limitation of this study was that the pool contributions of the IPD-MD+C game did not require participants to incur personal sacrifice to harm the members of the outgroup. However, the association where members who were willing to undertake personal costs for the ingroup in the intragroup context and also possessed strong anticipations of outgroup hostility were most eager to harm the outgroup even when there was an absence of threat, was demonstrated.

5.7. Conclusions

This study showed that highly self-sacrificing members with strong anticipations of outgroup hostility were more likely to pre-emptively harm

outgroups, when there was no direct threat from the outgroup. Members with high self-sacrificing prosociality and strong anticipations of outgroup hostility may most likely be extremely alert and sensitive to superficial cues of outgroups that may not directly pose as a threat to the ingroup. Consequently, such members may over-evaluate the non-threatening outgroup as a potential danger to the ingroup and engage in aggression against the outgroup to mitigate its potential threat. When an outgroup exhibits low-level provocation, highly self-sacrificing members who anticipate outgroup hostility may also become generally less prosocial toward members of the ingroup and outgroup, which would allow more harm to be inflicted onto the outgroup. A study was used to assess whether the findings from the three studies based on the minimal group paradigm and decontextualized games could be obtained using a real-group context where measurements of intergroup perceptions would be based on relatively more ecologically valid targets and intergroup behaviours reflecting ingroup welfare and outgroup aggression.

6. CHAPTER 6: ANALYZING A SEQUENTIAL PATHWAY OF THE POSITIVE ASSOCIATION BETWEEN SELF-SACRIFICING PROSOCIALITY AND OUTGROUP AGGRESSION THROUGH READINESS TO SELF-SACRIFICE AND ANTICIPATED OUTGROUP HOSTILITY

6.1. Testing a sequential pathway of the association between self-sacrificing prosociality and outgroup harm

“If we [Buddhists in Myanmar] do not protect our own people, we will become weak...they grow to outnumber us...When they [Muslims] are strong, they are like a wolf or a jackal, in large packs they hunt down other animals...” (Ashin Wirathu, a Burmese Buddhist monk in a BBC documentary as cited in Fuller, 2013). Such vitriolic quotes about the feared potency of the enemy continue to stoke sectarian violence against Muslims where Buddhist monks and followers have been arrested for arson attacks on Muslim properties (Straits Times, 2017) and physical attacks on Rohingya refugee homes (Straits Times, 2018). This anticipation of potential intimidation from the outgroup could be a critical psychological process that catalyses how highly fused members who may readily self-sacrifice to safeguard ingroup welfare in an intragroup context may become motivated to self-sacrifice to harm the outgroup without clear and direct ingroup benefit in an intergroup context.

Consistent with the identity fusion theory, highly fused individuals in a group develop close relational ties with other fellow members which fosters perceptions of kinship (Newson et al., 2019; Sheikh et al., 2016). Through viewing one another through the lens of familial relations, strongly fused persons may acquire an elevated sense of protection, obligation, and duty

toward the group that activates them to be acutely attentive to minor cues of potential threats that may harm the group (Swann et al., 2014b). In an intergroup context, strongly fused members who seek to protect their ingroup could be highly vigilant and ready to self-sacrifice for ingroup well-being.

When the presence of the outgroup is made salient, these members may strongly assume that the presence and activities of the outgroup would be aimed at striking the ingroup, which highly self-sacrificing members may interpret as intentionally spiteful and detrimental for the ingroup. With their vengeful mindsets, these members could consecutively cognize that aggressive retaliation would be appropriate so that the outgroup should be reciprocally hurt and the impact of threat would be reduced. Anticipating that the outgroup would cause potential harm to the ingroup, self-sacrificing members may willingly undertake personal costs and risks to aggress against the outgroup than to exclusively seek instrumental benefits for the ingroup. Activation or increased awareness of one's group identity brings to mind unique values, norms, and familial bonds that are shared with group members which consequently yield and increase fusion with the group (Swann et al., 2014). Even when real group identities are made salient, highly self-sacrificing individuals may not differentiate between the magnitudes (i.e., strong versus weak severity) of threats from hypothetical and real outgroups, and may engage in outgroup harm more readily than ingroup benefit, which would parallel the findings with earlier reported studies.

For this study, the relationships between self-sacrificing prosociality, vengeance, and outgroup aggression identified in Studies 1, 2, and the proposed mechanism of anticipations of outgroup hostility from Study 3 were integrated

into a more granular, conceptual model. This model was tested using real group identities, perceptions, and contexts rather than abstract decision-making in decontextualized settings and minimal group memberships. This study examined the conceptualized relationships within the U.S. society. Following studies on how identity primes have been employed to make the group membership salient, this study used the identity priming approach to evoke and increase national identification with the U.S. (Van Hoorn, 2017). The purpose of this study aimed to test whether individuals who may perceive themselves as strongly fused with the U.S. would be motivated to engage in extreme pro-group behaviours like self-sacrifice and passive to active forms of outgroup aggression like the willingness to support harsh policies directed at the outgroups to carrying out persecutory actions (Swann et al., 2015), through increased readiness to self-sacrifice and anticipations of outgroup hostility.

In this study, anticipations of outgroup hostility will be employed as a mediator between self-sacrificial readiness and support for harsh policies toward the outgroup that was either portrayed as a weak or strong threat to the ingroup. However, in Study 3, anticipations of outgroup hostility was identified as a moderator of the relationship between self-sacrificing prosociality and outgroup aggression in the absence of outgroup threat. Self-sacrificing prosociality and anticipations of outgroup hostility (through expected contributions from the outgroup to solely harm the ingroup) could be independent of (or unrelated to) one another because individuals who are willing to self-sacrifice may have a range of (none to strong) anticipations of outgroup hostility in the absence of outgroup threat. Unlike the absence of outgroup threat, the awareness of potential threat from a weakening outgroup in

this study, could directly trigger highly self-sacrificing members to anticipate outgroup hostility.

6.2. Study hypothesis

A hypothesis was developed and tested in Study 4. Increasing the salience of group identification may evoke fusion toward that group, which may generate self-sacrificial readiness. When threats to the ingroup are perceived as evident, highly self-sacrificing members who seek to protect the group, may become ready to incur personal costs to remove the threat. In an intergroup context, highly self-sacrificing members who also possess strong vengeful mindsets may be highly prone to view the presence and actions of an outgroup as possible dangers to the ingroup, irrespective of whether the outgroup poses as a direct threat to the ingroup. To members who are highly self-sacrificing and also strongly vengeful, mitigating such fears and anticipations of potential harm from the outgroup would necessitate perceived and actual dangers and provocations to be incapacitated through retaliation. At high levels of vengeance, individuals with strong self-sacrificial readiness could be more attentive and sensitive to potential threats to the U.S. and thus may likely to anticipate outgroup hostility, compared to low levels of vengeance (see Figure 22). The following hypothesis involves the variables from Hypotheses 1 to 3 that were observed in the earlier studies.

Hypothesis 4: Individuals whose U.S. identity was made salient, compared to a control condition, would report greater self-sacrificing prosociality which would predict increased anticipations of outgroup hostility, and in turn, predict strong support for outgroup harm policies. The relationship between self-

sacrificing prosociality and anticipations of outgroup hostility will be moderated by vengeance.

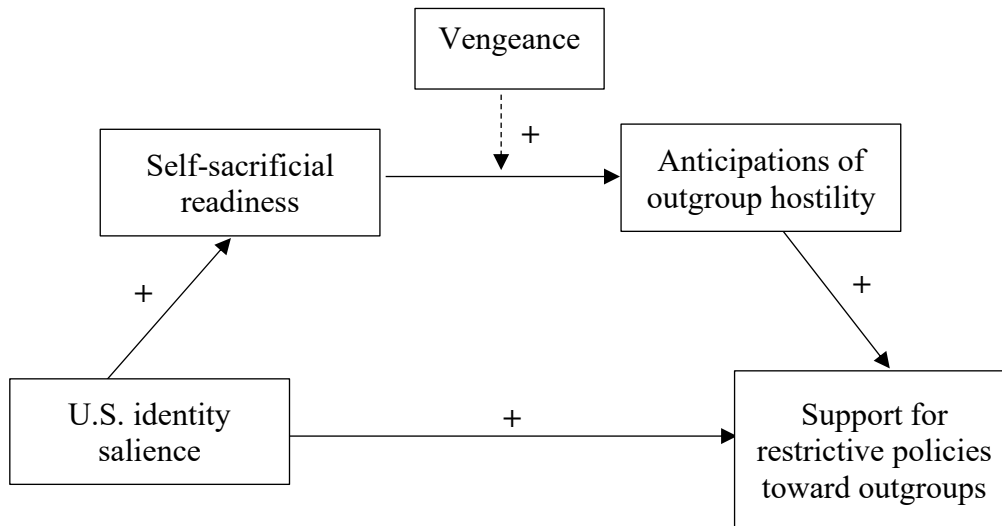


Figure 22. The relationship between identity salience and support for outgroup harm policies mediated by self-sacrifice readiness and anticipations of outgroup hostility, with vengeance as a moderator and outgroup threat severity as a covariate.

6.3. Method

6.3.1. Participants

Three hundred and fifty participants were recruited through the Amazon MTurk platform. An *a priori* power analysis using the G*Power program indicated that, based on a linear multiple regression analysis, a sample size of 92 participants was adequate to have 80% power to detect a medium effect size of .15 at an α -level of .05. Participants were asked items on their nationality and religion to understand their cultural backgrounds. The final sample comprised of 299 adults who stated that they held U.S. citizenship (161 women, $M_{age} = 39.32$ years, $SD_{age} = 12.62$), after excluding 51 participants who did not

complete the essay writing task ($n = 21$), were of Islam religion ($n = 2$), recorded a time duration that was lesser than 5 seconds to read the outgroup vignettes ($n = 26$), and were non-U.S. citizens ($n = 2$). In the final sample, the majority of participants were Christians ($n = 167$) and the remaining participants belonged to non-Islamic religious orientations such as Hinduism, Judaism, Buddhism, atheism, and others.

6.3.2. Study design

This study followed a 2 (U.S. identity salience: *high* vs. *control*) x 2 (outgroup threat severity: *strong* vs. *weak*) between-subjects design. The U.S. identity salience and outgroup threat severity variables were between-subjects factors and consisted of two levels. There were four conditions: (1) high U.S. identity salience and strong outgroup threat severity; (2) high U.S. identity salience and weak outgroup threat severity, (3) control group for U.S. identity salience and strong outgroup threat severity; and (4) control group for U.S. identity salience and weak outgroup threat severity.

Following the identity salience manipulation described in Hong et al. (2004), participants in the high U.S. identity salience condition were asked to write a 100-word essay on how U.S. citizens should unite to build a better society. Participants in the control condition were asked to write a 100-word essay about their everyday routine activities. This manipulation task could increase the salience of the U.S. identity by accentuating the prototypic characteristics that U.S. citizens share, perceptions of connectedness to the U.S., and relational ties with fellow members in the group, which are aspects of identity fusion and may thus activate feelings of fusion (Swann et al., 2014).

Participants assigned to the strong outgroup threat severity were asked to read a vignette that portrayed the outgroup as currently gaining membership strength and influence within the U.S. Participants assigned to the weak outgroup threat severity were asked to read a vignette that portrayed the outgroup as currently losing membership strength and influence within the U.S.

6.3.3. Measures

Identity salience manipulation. Participants were asked to write a short essay on how U.S. citizens should unite to build a better society. Hong et al. (2004) employed this manipulation to experimentally increase the salience of a particular social identity so as to test its causal role. Although this manipulation could be suggested to prompt perceptions of collective goals, it would enable the collective identity of the group to become salient to the participants. To test whether this task indeed manipulated identity salience, manipulations checks were utilized. Activating the social self through increased salience of the group identity would amplify feelings of connectedness and relational ties with members in the group and increase the sense of duty to protect, which in turn, may foster fusion with the group (Swann et al., 2012). Half of the participants were randomly assigned to a control condition where they were asked to write a short essay about how they organized their daily routine activities.

Identity fusion. The identity fusion scale (Gómez et al., 2011) measured perceived feelings of oneness with the U.S. In this study, identity fusion was posited as the initial factor in the conceptualized pathway. Identity fusion was used as a manipulation check to assess whether participants who were primed with the U.S. identity would report high fusion levels. Participants indicated the

degree of agreement to each statement that reflected their relationship with the U.S., based on a scale of 1 (*Strongly disagree*) to 6 (*Strongly agree*). The Cronbach's α of the final scale was .97.

Self-sacrificial readiness. The readiness to self-sacrifice scale (Bélanger et al., 2014) was utilized as a measure of self-sacrificial readiness and was adapted to this study. Participants provided their level of agreement to 10 statements about their willingness to self-sacrifice for the U.S., on a scale of 1 (*Not agree at all*) to 7 (*Very strongly agree*). Higher scores indicated greater self-sacrificial readiness. The Cronbach's α of the final scale was .88.

Outgroup threat vignettes. Two vignettes based on a hypothetical, U.S.-based ultraorthodox Islamic group were developed and utilized in this study. The vignettes described the group as being monitored by security agencies and had been designated as a no-threat organization. The vignettes portrayed the group as currently either gaining or losing membership strength and influence within the U.S. (see Appendix D). Participants were randomly assigned to read one of the vignettes. The vignettes served as a manipulation of threat from the outgroup as strength and size of an outgroup have been shown to increase threat perceptions toward outgroups (Earle & Hodson, 2019; Schlueter & Scheepers, 2010) and have been manipulated to arouse perceptions of outgroup threat (Outten et al., 2012). The information about the membership strength of the outgroup could be used to manipulate outgroup threat.

Favourability toward outgroup. After reading the vignette, participants responded to a feeling thermometer scale, which measured the favourability toward the Islamic group, on a scale ranging from 0 (*Cold or unfavourable*) to 100 (*Warm or favourable*).

Anticipations of outgroup hostility. Participants responded to three items about positive expectations and seven items on negative expectations of the ultraorthodox Islamic outgroup, using a scale that ranged from 1 (*Not at all*) to 7 (*Very much*). Examples of positive expectations included “*How safe is this group to America?*” and “*How supportive are you of this group?*”, while “*How hateful is this group towards America?*” and “*How fearful are you of this group?*” represented negative expectations. The positive expectations were reverse-coded and averaged with negative expectations to form a mean score of anticipated outgroup hostility. Higher scores indicated higher levels of anticipated outgroup hostility. The Cronbach’s α of the final scale was .93.

Similar to the three pool types measured in Study 2, three policy support scales were created and used as the primary outcome measures in this study. The policy support scale to benefit the welfare of the U.S. reflected the motive for ingroup benefit, the scale on policies to bolster security for the U.S. was aimed at measuring the motive for ingroup benefit and outgroup harm, while the scale with policies to restrict the outgroup was used to measure the motive for outgroup aggression (see Appendix D).

Ingroup benefit policies. Participants answered four items that asked about their level of support toward allocating government funds for policies to improve the welfare of the U.S. like “*Support programs to improve affordability and quality of healthcare*” and “*Improve quality of public schools*” on a scale of 1 (*Not at all supportive*) to 10 (*Very supportive*). Higher scores indicated greater policy support. The Cronbach’s α of the final scale was .85.

Ingroup defence policies. Participants answered four items that probed their support toward allocating government funds for policies to increase

security and defence measures for the U.S. like “*Strengthen law enforcement agencies (manpower, equipment, technology)*” and “*Strengthen border security (manpower, equipment, technology)*”, on a scale of 1 (*Not at all supportive*) to 10 (*Very supportive*). Higher scores indicated greater policy support. The Cronbach’s α of the final scale was .79.

Outgroup harm policies. Participants responded to six items that asked about their level of support toward allocating government funds for aggressive policies to restrict or regulate activities of the ultraorthodox Islamic group like “*Forcibly disband the Muslim group*” and “*Detain leaders and influential members in the Muslim group*”, on a scale of 1 (*Not at all supportive*) to 10 (*Very supportive*). Higher scores indicated greater policy support. The Cronbach’s α of the final scale was .96.

Forced-choice policy support. Participants were told that the government funds were limited and were asked to indicate how supportive were they of allocating these funds for three specific policy programs. The three policy programs were to improve the security of the U.S., increase the welfare of the U.S., and restrain the ultraorthodox Islamic group. Participants provided their level of support for each program using a scale of 1 (*Not at all supportive*) to 100 (*Very supportive*) and were informed that the level of support for all three programs should total to 100. Higher scores indicated stronger support for a specific policy program.

Policies towards actual terrorist groups. Four items were used to assess participants’ level of support toward aggressive policies to counter terrorist groups like “*Indefinite incarceration at undisclosed facilities*” and “*Authorize greater frequency and intensity of drone strikes on foreign terrorist hideouts*”

located within civilian centers”, on a scale of 1 (*Not at all supportive*) to 10 (*Very supportive*). Higher scores indicated stronger policy support ($\alpha = .86$).

Vengeance. The vengeance scale (Stuckless & Goranson, 1992) utilized in Study 2 was used to measure vengeance. The Cronbach’s α of the final scale was .96.

Posse scale. The posse against radicals scale (Altemeyer, 1996) measures the degree of willingness to support and engage in increasingly hostile acts against an outgroup such as communist groups and extremists. This scale was adapted to this study in which radical Islamic groups were described as the outgroup. Participants indicated their willingness to participate in increasingly violent acts against radical Islamic groups. Each of the six items was rated on a scale of 1 (*Strongly disagree*) to 6 (*Strongly agree*). Higher scores indicated willingness to engage in increasingly more aggressive or violent actions against radical Islamic groups. The Cronbach’s α of the final scale was .92.

6.3.4. Procedure

After obtaining informed consent, participants were asked to individually write a short 100-word essay on the given topic on either building a united American society or everyday routine activities. The essay writing manipulation served as a priming task to increase the salience of the U.S. identity or as a control condition respectively. After the essay task, participants answered the identity fusion scale, readiness to self-sacrifice scale, and read a vignette describing an ultraorthodox Islamic outgroup. After reading, participants completed the feeling thermometer scale about the outgroup, the scale on anticipations of

outgroup hostility, a series of policy support measures, self-report scales, and demographic questions before being debriefed.

6.4. Results

6.4.1. Manipulation checks

Participants ($n = 137$) who were primed with the U.S. identity reported greater identity fusion with the U.S. ($M = 3.96, SD = 1.22$) than the control condition ($n = 162$) ($M = 3.61, SD = 1.42$), $F(1, 297) = 5.19, p = .02, d = .27$. There was no significant difference in favourability ratings of the Islamic group portrayed as strong ($n = 150, M = 26.95, SD = 24.14$) or weak ($n = 149, M = 24.27, SD = 24.53$), $F(1, 297) = .91, p = .34$.

6.4.2. Correlations between mean self-sacrificial readiness and mean policy support measures

Correlation results indicated that there were moderate associations between self-sacrificial readiness and policy support toward ingroup benefit, ingroup defence, and outgroup harm, $r_s(299) = .39, p_s < .001$. Table 8 presents the correlations between mean self-sacrificial readiness and mean policy support for ingroup benefit, ingroup defence, and outgroup harm in Study 4.

Table 8

Correlation coefficients of mean self-sacrificial readiness and mean policy support for ingroup benefit, ingroup defence, and outgroup harm.

	1	2	3	4
1. Self-sacrificial readiness	1			
2. Mean support for ingroup benefit policies	-.27***	1		
3. Mean support for ingroup defence policies	.39***	.10	1	
4. Mean support for outgroup harm policies	.31***	-.30***	.51***	1

* $p \leq .05$, ** $p \leq .01$, *** $p \leq .001$.

6.4.3. Means comparisons of policy support toward the U.S. (ingroup) and the Islamic group (outgroup)

A 2x2 between-subjects ANOVA was used to analyze the effects of U.S. identity salience (U.S. identity salience: *high* vs. *control*) and outgroup threat severity (outgroup threat severity: *strong* vs. *weak*) on policy support toward ingroup benefit⁶, ingroup defence⁷, and outgroup aggression⁸; forced-choice policy measures, countermeasures against actual terror groups; and willingness to engage in increasingly hostile actions against the outgroup. There were four dependent variables that related to the measurement of outgroup aggression:

⁶ Ingroup benefit policies refer to policies to enhance the well-being of the U.S.

⁷ Ingroup defence policies refer to policies to bolster the security of the U.S.

⁸ Outgroup defence policies refer to policies to restrict the Islamic group.

policy support toward outgroup harm, forced-choice policy toward outgroup harm, support for anti-terror policies, and support for posse actions. The p -value of .05 was thus corrected to .0125. There was no significant main effect of identity salience on the outcome variables, $F_s(1, 295) > .02, p_s > .63$. There was no significant main effect of outgroup threat severity on the outcome variables, $F_s(1, 295) > .001, p_s > .38$. There was no significant interaction effect of identity salience and outgroup threat severity on policy support for ingroup defence and outgroup harm, forced-choice policy measures, support for measures against actual terror groups, and willingness to engage in increasingly hostile outgroup actions, $F_s(1, 295) > .48, p_s > .06$. There were significant interaction effects of identity salience and outgroup threat severity on ingroup benefit policies, $F(1, 295) = 3.92, p = .049$. Pairwise comparisons showed that the control condition which was either exposed to the strong ($M = 7.13, SD = .25$) or weak ($M = 7.92, SD = .27$) outgroup threat, differed significantly from each other in the support for ingroup benefit policies, $p = .04$. The high identity salience condition which was exposed to the strong ($M = 7.62, SD = .30$) or weak ($M = 7.32, SD = .28$) outgroup threat, did not differ significantly from each other in the support for ingroup benefit policies, $p = .46$. The comparisons of means of support toward the policy programs are presented in Figure 23. The two outgroup threat severity conditions were merged and treated as a covariate in subsequent analyses as there was no significant difference between the conditions.

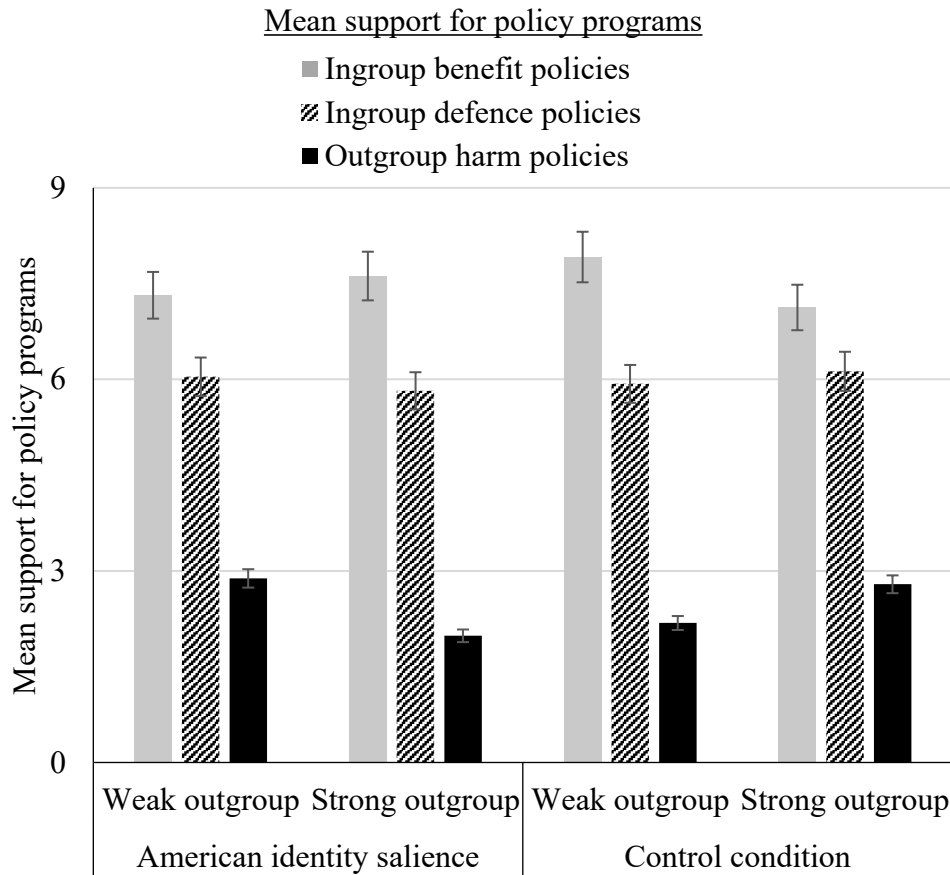


Figure 23. Mean comparison of policy support across four conditions based on identity salience (U.S. identity salience vs. Control condition) and outgroup threat levels (Strong vs. Weak outgroup threat). The error bars represent standard errors.

6.4.4. Moderated serial mediational analysis with self-sacrificial readiness and anticipated outgroup hostility as mediators predicting support for policy programs

To examine the conceptualized relationships between identity salience manipulation, self-sacrificial readiness, anticipations of outgroup hostility, and support for outgroup harm policies, a moderated serial mediation analysis based on the bias-corrected bootstrapping approach with 10,000 bootstrap samples

(Hayes, 2013; PROCESS Model 91) was employed. The hypothesized pathway from identity salience (control condition = 0, U.S. identity salience = 1) → self-sacrificial readiness → anticipations of outgroup hostility → support for outgroup harm policies was significant, $b = .06$, $SE = .03$, 95% CI [.009, .123] (see Figure 24). The strength of outgroup threat was controlled for. The corrected p -value of .0125 was applied to analyses with the four dependent variables measuring support for outgroup harm. The direct effect of identity salience manipulation on support for outgroup harm policies was not significant, $b = -.51$, $SE = .29$, 95% CI [-1.08, .07]. A significant index of moderated mediation was observed when support for policies focused on ingroup defence was analyzed as an outcome variable, $b = .03$, $SE = .01$, 95% CI [.004, .06]. Compared to the policy support focused on ingroup defence ($b = .03$), the index of moderated mediation was greater for the support for outgroup harm policies ($b = .06$). The pathway was not significant for support for ingroup benefit policies, $b = -.01$, $SE = .01$, 95% CI [-.026, .003]. The magnitude of the indirect effects for the two separate models with the dependent variable as the support for outgroup harm policies and as support for ingroup benefit policies were compared. Each indirect effect tested the pathway from identity salience conditions to policy support measure, through self-sacrificial readiness and anticipations of outgroup hostility. The two models consisted of the same structure and variables except for their dependent variables which were rated on the same Likert scale. Hence, the models were not analysed as a single model with two dependent variables and did not include each policy support measure as a covariate. The indirect effect for the model with support for outgroup harm policies as the dependent variable ($b =$

.155, $SE = .067$) was significantly greater than the indirect effect for the model with support for ingroup benefit policies as the dependent variable ($b = -.021$, $SE = .019$), $t(596) = -43.56$, $p < .001$, 95% C.I. [-.184, -.168]. These results suggest that individuals whose American identity was made salient, were more likely to support outgroup harm policies than ingroup benefit policies, through increased self-sacrificial readiness and anticipated outgroup hostility.

Hypothesis 4 which predicted that individuals whose U.S. identity was made salient, compared to a control condition, would report greater self-sacrificing prosociality which would predict increased anticipations of outgroup hostility, and in turn, predict strong support for outgroup harm policies, regardless of whether this group was depicted to have either strong or weak membership and influence (i.e., potential for threat) within the U.S., was supported. The relationship between self-sacrificing prosociality and anticipations of outgroup hostility was moderated by vengeance. For individuals with high levels of vengeance, self-sacrificial readiness for the U.S. significantly predicted anticipations of hostility from the Islamic group, $b = .41$, $t(293) = 3.94$, $p < .001$. For individuals with low levels of vengeance, self-sacrificial readiness for the U.S. did not significantly predict anticipations of hostility from the Islamic group, $b = .04$, $t(293) = .42$, $p = .67$.

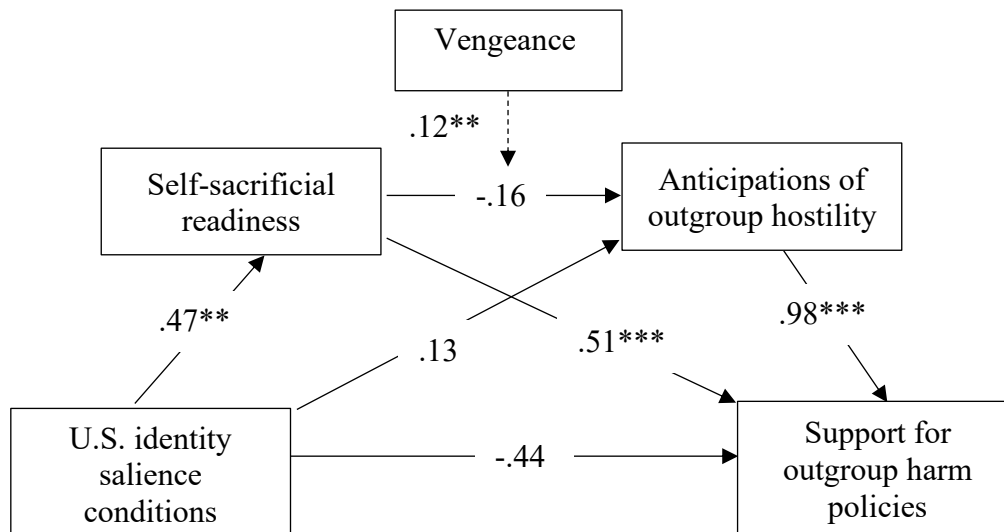


Figure 24. Self-sacrifice readiness and anticipations of outgroup hostility mediated the relationship between U.S. identity salience conditions and support for restrictive policies toward the outgroup with vengeance as a moderator and outgroup threat severity as a covariate. $*p \leq .05$, $**p \leq .01$, $***p \leq .001$.

The results of additional moderated mediational analyses that were conducted using seven different outcome variables which were (1) support for ingroup benefit policies, (2) support for ingroup defence policies, (4) forced-choice support for the ingroup benefit policies, (5) forced-choice support for the ingroup defence policies, (6) forced-choice support for the outgroup harm policies, (7) support for anti-terror policies, and (8) support for posse actions, are presented in Table 9. The pathway was significant for (2) support for ingroup defence policies, (4) forced-choice support for the ingroup benefit policy program, (6) forced-choice support for the outgroup harm policy program, (7) support for anti-terror policies, and (8) support for posse actions. Individuals whose U.S. identity was made salient, compared to a control condition, were likely to report greater self-sacrificing prosociality which

predicted increased anticipations of outgroup hostility, and in turn, predicted (2) strong support for ingroup defence policies, (6) forced-choice support for outgroup harm policies, (7) support for anti-terror policies, and (8) possible actions. However, individuals whose U.S. identity was made salient, compared to a control condition, were not likely to report greater (1) support for ingroup benefit policies and (5) forced-choice support for ingroup defence policies. These results provide further support for the hypotheses that self-sacrificing readiness and heightened retaliatory mindsets may produce increased support for outgroup aggression through higher levels of anticipated hostility from outgroups. The outgroup threat severity variable was controlled for. There were no significant effects of gender on the policy support categories and countermeasures.⁹

⁹ The gender variable was not a key factor of analysis in this study. However, gender and outgroup strength were submitted as covariates in moderated mediational analyses using identity fusion conditions as the independent variable and support for outgroup harm policies as the dependent variable. Results showed that the hypothesized moderated mediational associations from identity fusion to support for outgroup harm remained significant, $p_s < .01$. Similar results were obtained when ingroup defence and ingroup benefit policy support were used as outcome variables.

Table 9

Regression coefficients of moderated mediational analyses with self-sacrificial readiness and anticipations of outgroup hostility mediating the relationship between identity salience manipulation and support for policies and countermeasures

	B	S.E	<i>t</i>	95% C.I.
Mediator variable models				
Readiness to self-sacrifice				
Constant	3.30***	.14	23.94	3.03, 3.57
Identity salience conditions	.47**	.16	2.94	.15, .78
Outgroup strength (covariate)	.10	.16	.65	-.21, .42
$F(2, 296) = 4.40^{**}$				
$R^2 = .03$				
	B	S.E	<i>t</i>	95% C.I.
Anticipations of outgroup hostility				
Constant	3.68***	.64	5.71	2.41, 4.94
Identity salience conditions	.24	.21	1.18	-.16, .65
Readiness to self-sacrifice	-.22	.17	-1.28	-.56, .12
Vengeance	-.24	.21	-1.16	-.64, .17

Readiness to self-				
sacrifice x	.15**	.05	2.76	.04, .26
Vengeance				
Outgroup strength				
(covariate)	.06	.20	.31	-.34, .47
$F(5, 293) = 6.03***$				
$R^2 = .09$				
Dependent variable models				
	B	S.E	<i>t</i>	95% C.I.
(1) Support for ingroup benefit policies				
Constant	9.55***	.45	21.1	8.66, 10.44
Identity salience				
conditions	.18	.27	.68	-.35, .71
Readiness to self-				
sacrifice	-.45***	.10	-4.60	-.64, -.26
Anticipations of				
outgroup hostility	-.11	.07	-1.48	-.26, .04
Outgroup strength				
(covariate)	-.24	.27	-.89	-.76, .29
$F(4, 294) = 6.90***$				
$R^2 = .09$				
(2) Support for ingroup defence policies				
Constant	2.43***	.45	5.39	1.54, 3.32

Identity salience conditions	-.51	.27	-1.88	-1.04, .02
Readiness to self-sacrifice	.66***	.10	6.75	.47, .85
Anticipations of outgroup hostility	.38***	.07	5.13	.23, .52
Outgroup strength (covariate)	-.09	.26	-.34	-.61, .43
$F(4, 294) = 21.48***$				
$R^2 = .23$				
	B	S.E	<i>t</i>	95% C.I.
(3) Support for outgroup harm policies				
Constant	-2.19***	.49	-4.48	-3.16, -1.23
Identity salience conditions	-.51	.29	-1.73	-1.08, .07
Readiness to self-sacrifice	.52***	.11	4.90	.31, .73
Anticipations of outgroup hostility	.81***	.08	10.03	.65, .96
Outgroup strength (covariate)	-.20	.29	-.68	-.76, .37
$F(4, 294) = 36.26***$				
$R^2 = .33$				

	B	S.E	<i>t</i>	95% C.I.
(4) Forced-choice support for ingroup benefit policies				
Constant	90.96***	4.23	21.51	82.64, 99.28
Identity salience conditions	5.01*	2.52	1.98	.04, 9.97
Readiness to self-sacrifice	7.68***	.92	-8.39	-9.49, -5.88
Anticipations of outgroup hostility	-2.95***	.69	-4.26	-1.58
Outgroup strength (covariate)	1.51	2.48	.61	-3.36, 6.39
$F(4, 294) = 25.83***$				
$R^2 = .26$				
(5) Forced-choice support for ingroup defence policies				
Constant	20.13***	3.74	5.37	12.77, 27.49
Identity salience conditions	-3.10	2.23	-1.39	-7.48, 1.29
Readiness to self-sacrifice	4.65***	.81	5.75	3.06, 6.25
Anticipations of outgroup hostility	.007	.61	.01	-1.20, 1.21
Outgroup strength (covariate)	-3.62	2.19	-1.65	-7.93, .69

$F(4, 294) = 9.04^{***}$				
$R^2 = .11$				
(6) Forced-choice support for outgroup harm policies				
Constant	-11.09***	2.75	-4.03	-16.51, -5.68
Identity salience conditions	-1.91	1.64	-1.16	-5.14, 1.32
Readiness to self-sacrifice	3.03***	.60	5.08	1.86, 4.20
Anticipations of outgroup hostility	2.94***	.45	6.52	2.05, 3.83
Outgroup strength (covariate)	2.10	1.61	1.31	-1.07, 5.28
$F(4, 294) = 21.10^{***}$				
$R^2 = .22$				
	B	S.E	<i>t</i>	95% C.I.
(7) Support for anti-terror policies				
Constant	.20	.55	.37	-.87, 1.27
Identity salience conditions	-.64	.33	-1.96	-1.28, .004
Readiness to self-sacrifice	.76***	.12	6.40	.52, .99
Anticipations of outgroup hostility	.44***	.09	4.90	.26, .61

Outgroup strength (covariate)	-.08	.32	-.26	-.71, .55
$F(4, 294) = 19.44^{***}$				
$R^2 = .21$				
(8) Support for posse actions				
Constant	.31	.23	1.34	-.15, .77
Identity salience conditions	-.16	.14	-1.18	-.44, .11
Readiness to self- sacrifice	.37 ^{***}	.05	7.30	.27, .47
Anticipations of outgroup hostility	.24 ^{***}	.04	6.23	.16, .31
Outgroup strength (covariate)	-.03	.14	-.20	-.30, .24
$F(4, 294) = 27.64^{***}$				
$R^2 = .27$				
<i>Conditional Indirect effect at Vengeance ±1SD</i>				
-1SD (1.74)	.04	.10	.42	-.15, .23
Mean (2.97)	.23 ^{**}	.07	3.04	.08, .37
+1SD (4.21)	.41 ^{***}	.10	3.94	.21, .61

* $p \leq .05$, ** $p \leq .01$, *** $p \leq .001$.

6.5. Discussion

This study hypothesized that highly fused U.S. citizens would be associated with greater support for outgroup harm policies, through increased self-sacrificial readiness and anticipations of outgroup hostility. Findings directly supported the hypothesized pathway. The relationship between identity salience and outgroup aggression, mediated by self-sacrificial readiness and anticipations of outgroup hostility, was more pronounced for individuals with mean and high levels of vengeance. These findings provide preliminary evidence for a potential mechanism underlying the observed patterns in Studies 1 to 3. Indicative of the dominant option on support for outgroup harm policies among highly self-sacrificing members, the hypothesized pathway was not observed for outcome variables for the forced-choice ingroup benefit and ingroup defence policy support, regardless of strong or weak threat from the Islamic group. Although the roles of reciprocity and reputational concerns may not have been tested in this study, the theory of bounded generalized reciprocity predicts highly self-sacrificing members would greatly endorse policies that benefit the welfare of the U.S. The theory of parochial cooperation which advocates the maximisation of intergroup difference, would predict that highly self-sacrificing members would strongly support policies to defend the U.S. Countering the predictions of both alternative theories, the findings demonstrated that individuals who were ready to self-sacrifice in intragroup contexts were more predictive of the willingness to allocate (limited) funding to support harsh policies directed toward the Islamic outgroup relative to ingroup benefit and ingroup defence policy measures, regardless of outgroup threat. To highly self-sacrificing members, maximising intergroup differences or

increasing ingroup welfare as predicted by the parochial cooperation and bounded generalized reciprocity respectively, may not directly eliminate the threat from the Islamic outgroup and safeguard the ingroup. Consistent with the CSA framework, highly self-sacrificing members thus may not rationalize and behave like parochial co-operators (or altruists) who simultaneously help the ingroup and harm the outgroup but could be more likely to anticipate the outgroup as intentionally hostile and seek to terminate this threat.. In line with the CSA framework, the proposed psychological mechanism of anticipated outgroup hostility may direct highly fused members who are willing to self-sacrifice for their group toward the motive to harm the outgroup relative to the motive of ingroup well-being, and may not discriminate between different severity levels of outgroup threat as they might be highly and constantly vigilant to any signal that may indicate potential threat for the ingroup.

6.6. Limitations

A limitation in this study was the lack of a covariate that could measure whether highly self-sacrificing Americans may have held reciprocity concerns toward their fellow citizens, such that all Americans would be expected to display similar levels of self-sacrificial readiness for the welfare of the U.S. By controlling for this expectancy, the proactive readiness to self-sacrifice among highly members could be shown to be independent of the perceptions of self-sacrifice from other members which was employed as a covariate in Studies 1 to 3. A second limitation was that support for actions of outgroup harm may not completely suggest that there might not be any intangible, symbolic gains like increased status and respect for the ingroup. However, Studies 1 and 2 have

demonstrated that the motive of highly self-sacrificing members was aimed at harming the outgroup. Although contributions to directly benefit the ingroup could produce both tangible and symbolic gains for the ingroup, results showed that the allotment decisions of highly self-sacrificing members were associated to outgroup harm over ingroup benefit, suggestive of how symbolic gains for the ingroup may not be a priority for highly fused and self-sacrificing members in an intergroup context.

6.7. Conclusions

This study provided initial evidence for the psychological mechanism of anticipations of outgroup hostility in motivating self-sacrificial behaviours for ingroup welfare toward self-sacrificial behaviours for outgroup aggression. The dynamics of how identity fusion and readiness to self-sacrifice that emerge within the ingroup in an intragroup context may transition into pre-emptive aggression directed toward the outgroup in an intergroup context, using real-world settings was unpicked in this study. This study required participants to draw on their U.S. identity and their views of radical Islamic outgroups as well as complete measures that reflected the different types of motivations underlying intergroup conflict, in which support for the positive association between self-sacrificial readiness and outgroup harm was further established.

7. CHAPTER 7: IDENTIFYING THE ROLE OF GROUP-BASED CONTEXTS ON THE POSITIVE ASSOCIATION BETWEEN SELF-SACRIFICING PROSOCIALITY AND OUTGROUP AGGRESSION

7.1. Changing from intra- to intergroup context frames outgroup negativity as attributions of ingroup positivity

“All suicide missions [in intergroup contexts] belong to a family of actions in which people go to the extremes of self-sacrifice in the belief that by doing so they will best further the interests of a group [in intragroup contexts]...they care about and identify with” (Gambetta, 2005, p. 270). Suicide bombers see themselves as martyrs with unconditional commitment and their martyrdom operations as crucial undertakings to protect their group while wreaking mass destruction to their enemies. Perceiving their violent self-sacrifice that harms the outgroup as a *pro-group action of care and protection* could be conditional on the psychological mechanism of anticipations of outgroup threat that may most likely be activated in an intergroup context. When the ingroup faces an outgroup threat, highly self-sacrificing members may anticipate outgroup hostility and harm the adversarial outgroup. In contrast, when the ingroup faces an intragroup threat, anticipations of outgroup hostility may not be galvanized and motivate members to enhance the group’s welfare. The proposed mechanism of anticipated outgroup hostility could be most relevant when outgroup threat is salient in intergroup contexts, which may beget self-sacrificial motivations of outgroup harm relative to self-sacrificial motivations of ingroup benefit.

Highly fused individuals, who seek to protect the group, become highly invested in its welfare. In an intragroup context with a (non-outgroup) threat that may possibly harm the well-being of the ingroup, highly self-sacrificing members may perceive this threat as a danger to the ingroup. Such members may willingly self-sacrifice to defend against this threat. Such actions could be appraised as favouring the protection and welfare of the ingroup. In a study assessing the extent to which Jewish people who recalled the Holocaust may engage in ingroup strengthening behaviours, Wohl et al. (2010) showed that collective angst about the future of Jewish people mediated the relationship between Holocaust salience and support for ingroup strengthening behaviours like donating to Jewish organizations and promoting the Jewish way of life. This finding suggests that members who perceive threats to their group would seek to protect the well-being of the group.

The presence of an outgroup, which may signal as a threat, shifts one's mindset from ingroup-focused perspectives to intergroup-focused perspectives (Correll & Park, 2005). Demonstrating the role of radical contexts on support for political violence, Jasko et al. (2019) showed that radical, intergroup contexts that contain real or exaggerated grievances moderated the relationship between collective significance to readdress group threats like humiliation and support for political violence. Testing the effect of threats from historical conflicts on support for future violence, Li et al. (2016) found that, after South Korean participants read an article about the Korean War being portrayed as an interstate than an intrastate conflict, they were supportive of adopting aggressive approaches to resolve new tensions with previously unrelated countries. In the context of an unresolved intergroup conflict in Serbia,

Spanovic et al. (2010) showed that the perceived fear of Muslim Albanians was associated with increased inclinations for aggression like military attacks, trade sanctions, and control over civilian liberties, was mediated by ingroup affiliation with Serbs. In line with fear-induced beliefs that motivate defence against potential aggression from other groups, anticipations of outgroup hostility may surface in intergroup contexts and may prompt highly self-sacrificing members to preventatively retaliate against potential aggressors in defence. Using arbitrary group categories, Böhm et al. (2016) found that the intention to protect the ingroup was a crucial motivator of 'outgroup hate' in defensive reactions, and promoted pre-emptive offensive actions against outgroups, consistent with the tendency for anticipations of outgroup hostility, where outgroups are viewed as more competitive and hostile.

The results of Studies 1 and 4 showed that identity fusion predicted self-sacrificial readiness. Inferring from the theoretical and empirical observations, self-sacrificial readiness would serve as a mediator because highly fused Americans who are willing to self-sacrifice to protect their nation and people, would interpret ambiguous outgroups like foreign organisations as a threat, which produces anticipations of potential hostility from the outgroup.

Attributions of outgroup harm policies as concern for the U.S was predicted to a mediator because individuals who anticipate hostility from the foreign organisations would be motivated to terminate these outgroups to protect the ingroup. Individuals who strongly attribute outgroup harm actions as concern for the ingroup would become highly supportive of policies that are focused on outgroup harm than ingroup benefit. The purpose of this study was to examine whether the mechanism of anticipated outgroup hostility would be

observed for highly self-sacrificing members who encounter outgroup threats specifically in intergroup contexts, compared to intragroup contexts, and may consequently engage in outgroup aggression.

7.2. Study hypothesis

This study was pre-registered on Open Science Framework (OSF) research platform (see Appendix E). There were two preregistered hypotheses. First, it was predicted that priming sacrificial readiness and the presence of an intergroup context will be associated with greater perceptions of harsh policies toward outgroups as actions motivated by concern and compassion for the ingroup, compared to other conditions. Second, a moderated mediational model, in which priming sacrificial readiness would predict strong inclinations to view harsh policies toward the outgroup as actions motivated by concern and compassion for the ingroup, through anticipations of outgroup hostility, was predicted. In this model, the relationship between self-sacrificial readiness and anticipations of outgroup hostility is predicted to be moderated by vengeance and the presence of an intergroup context.

The preregistered hypotheses were developed *a priori* and were divided into three sub-hypotheses which were tested in Study 5. The study design follows a 2 (Sacrificial readiness: High vs. Low) x 2 (Context type: Intragroup vs. Intergroup) between-subjects design. The Sacrificial readiness and Context type variables are between-subjects factors and will consist of two levels. The study will recruit four hundred participants in which 100 participants are assigned to each condition. To test the first hypothesis, two-way ANOVA analyses will be used to examine interaction and main effects of sacrificial

readiness and context type on the level of attributions of concern for America/Americans relating to policies on ingroup benefit, ingroup defence, and outgroup aggression. To test the second hypothesis, moderated mediation will be used where the independent variable will be the sacrificial readiness condition (high vs low), the mediator will be anticipations of outgroup hostility, and the dependent variable will be attributions of concern and compassion for the ingroup reflected by aggressive policies against the outgroup. The first moderator will be vengeance and the second moderator will be context type (intragroup vs intergroup). For both hypotheses, the variables measuring participants' familiarity with the developments on China and pollution issues will be controlled for. Participants with missing data and those whose nationality is not 'USA' will be excluded. The official pre-registration for this study can be accessed at the following OSF link: <https://osf.io/34ksd>.

Highly self-sacrificing members would willingly undertake personal costs to protect their group. In an intergroup context with an outgroup that manifests unclear threats, highly self-sacrificing members with retributive mindsets would anticipate that the outgroup may engage in potentially hostile intent and actions to threaten the ingroup, which may necessitate a harsh reprisal. These members may perceive that the use of harmful actions would weaken the threat capability of the outgroup which would protect the safety and welfare of the ingroup, indicative of their care and concern for the ingroup. In consequence, highly self-sacrificing members may deem aggression as necessary and support harmful measures, as opposed to appraising actions of ingroup benefit as essential undertakings to protect the ingroup (see Figure 25). In line with the theoretical framework, highly fused individuals may become more attentive to

cues of threat and could willingly sacrifice personal resources to aggress against the threat. Even in the presence of an outgroup that might appear as an ambiguous danger, such individuals may anticipate outgroup hostility and strongly endorse harsh measures toward the outgroup, which would be unique to an intergroup context.

Hypothesis 5a: Individuals who were primed with self-sacrificial readiness and the presence of ambiguous outgroup threat in an intergroup context will be associated with stronger levels of attributions of aggressive policies and actions toward foreign organizations as measures that are motivated by concern and compassion for the ingroup, through increased anticipations of outgroup hostility.

Hypothesis 5b: Individuals who were primed with self-sacrificial readiness and the presence of ambiguous outgroup threat in an intergroup context will be associated with anticipations of outgroup hostility, through increased self-sacrificial readiness.

Hypothesis 5c: The relationship between self-sacrificial readiness and anticipations of outgroup hostility is predicted to be moderated by vengeance.

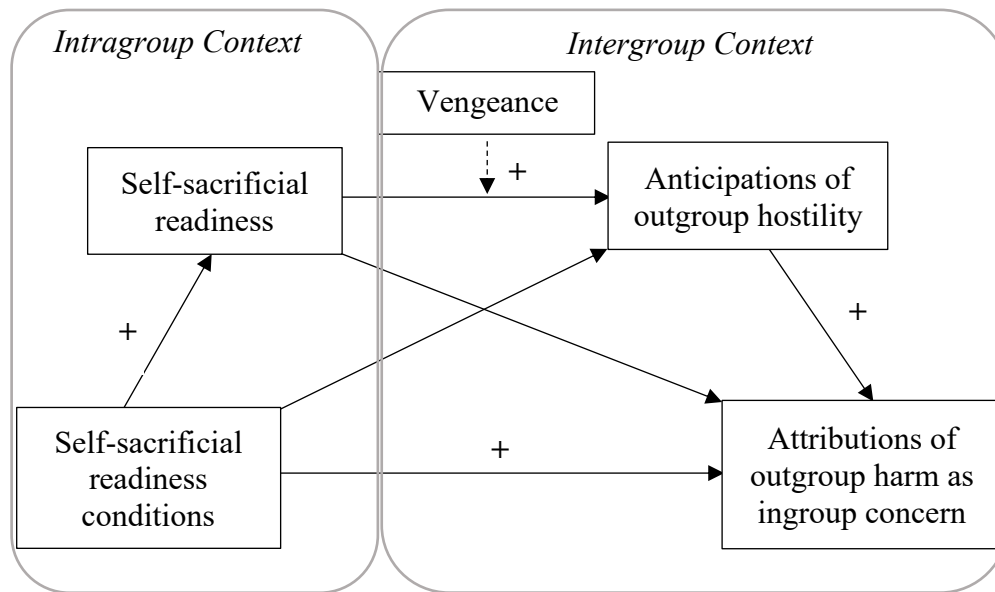


Figure 25. Proposed model based on hypotheses 5a to 5c. Hypothesis 5a involves the relationship from self-sacrificial readiness manipulation → anticipations of outgroup hostility → appraisal of outgroup harm policies as concern for the U.S. Hypothesis 5b involves the relationship from self-sacrificial readiness manipulation → self-sacrificial readiness → anticipations of outgroup hostility. Hypothesis 5c involves the moderating effect of vengeance on self-sacrificial readiness → anticipations of outgroup hostility (dashed arrow).

7.3. Method

7.3.1. Participants

Four hundred participants were recruited through Prolific online survey platform. The final sample comprised of 376 adults (56.1% women, $M_{age} = 34.56$ years, $SD_{age} = 10.43$), after excluding a total of 24 participants whose responses about the central theme of the article that they were asked to read reflected a misunderstanding of the question and were irrelevant. The majority of participants were White ($n = 275$), with 28 Black/African-Americans, 40

Asian/Asian-Americans, 23 Latino/Hispanic and 10 individuals who stated pan-ethnic racial identifications. There were 372 individuals with U.S. citizenship and four individuals who were permanent residency visa holders. An a priori power analysis using the G*Power program indicated that, based on a linear multiple regression analysis, a sample size of 92 participants was adequate to have 80% power to detect a medium effect size of .15 at an α -level of .05.

7.3.2. Study design

This study utilized a 2 (self-sacrificial readiness: *high* vs. *low*) x 2 (context type: *intragroup* vs. *intergroup*) between-subjects design. The self-sacrificial readiness and context type variables were between-subjects factors and consisted of two levels. There were four conditions: (1) high self-sacrificial readiness and intergroup context; (2) high self-sacrificial readiness and intragroup context, (3) low self-sacrificial readiness and intergroup context; and (4) low self-sacrificial readiness and intragroup context. Participants were asked to individually read a compilation of excerpts from news articles that reported about the 2011 Super Outbreak, which was a natural disaster that occurred in the U.S. The high self-sacrificial readiness condition read excerpts that focused on feelings of shared pain and sacrifices made by Americans who volunteered themselves to assist in rescue and recovery efforts during the natural disaster incident. The low self-sacrificial readiness condition read excerpts about the scientific facts, causes, and infrastructural damage of the natural disaster incident.

Participants in the intergroup context condition were asked to read excerpts of opinion news articles on current domestic and global developments

in China. In the intragroup condition, participants were asked to read excerpts from opinion news articles about current pollution levels and issues in the U.S. Deception was utilized in this study. For the articles on the natural disaster, scientific facts and risky volunteer activities were compiled from various news sources and presented as between-subject conditions because the information was expected to prime self-sacrificial readiness as low and high levels respectively. For articles about the fluctuations in the developments in China and U.S. pollution rates, the information was similarly gathered from various news sources and presented as between-subject conditions to prime realistic impressions of the type of context-specific, ambiguous threat.

7.3.3. Material

Natural disaster article manipulation. Two compilations of excerpts from news articles that reported about a natural disaster (2011 Super Outbreak) in the U.S. were developed and used in this study. Participants were randomly assigned to read a compilation that was either focused on feelings of shared pain and sacrifices made by Americans or scientific facts, causes, and infrastructural damage of the natural disaster.

Self-sacrificial readiness. The readiness to self-sacrifice scale (Bélanger et al., 2014) utilized in Study 4 was utilized as a measure of self-sacrificial readiness in this study. The Cronbach's α of the final scale was .89.

Identity fusion. The identity fusion scale (Gómez et al., 2011) used in Study 4 was employed in this study. The Cronbach's α of the final scale was .92.

Outgroup threat manipulation. Two vignettes, based on excerpts from opinion news articles about either current pollution levels and issues in the U.S or current domestic and global developments in China, were prepared for this study. The developments in China as well as the pollution situation in the U.S. that were stated in the articles were portrayed as being ambiguous threats to America. Participants were randomly assigned to read either one of the articles (see Appendix E).

Manipulation checks for vignette comprehension. After reading, participants were asked to rate how difficult, persuasive, and credible they thought the vignette was, on a scale of 1 (*Not at all*) to 7 (*Extremely*). Participants were then asked to state the central theme of the vignette that they had read.

Anticipations of harm. Participants in the intergroup context responded to three items on negative anticipations of China, using a scale that ranged from 1 (*Not at all*) to 7 (*Very much*). The negative expectations included “*How hateful is China towards America?*”, “*How harmful is China toward America?*” and “*How serious of a threat is China to America?*”. The expectations were averaged to form a composite for anticipated harm in the intergroup context which will be referred to as anticipations of outgroup hostility. Higher scores indicated higher levels of anticipated outgroup hostility. The Cronbach’s α of the final scale was .80.

Participants in the intragroup context answered two items about negative anticipations of current pollution levels and issues in the U.S., using a scale that ranged from 1 (*Not at all*) to 7 (*Very much*). The two negative expectations included “*How harmful are current pollution issues to America?*” and “*How serious of a threat are current pollution issues in America?*”. The item on hate

that was applicable to the article on current developments in China was not relevant for the article on current pollution issues in the U.S., and thus was not measured. The two negative expectations were averaged to form a mean score of anticipated threat in the intragroup context which will be referred to as anticipations of harm toward the U.S. Higher scores indicated higher levels of anticipations of harm for the U.S. The Cronbach's α of the final scale was .93.

The three policy support scales from Study 4 were used as the primary outcome measures in this study. All three scales were changed for the purpose of this study, in which the instructions and anchors of the scales were adapted to measure how much concern, empathy, and compassion for the welfare of the U.S. did each policy program represent, as opposed to the level of willingness to support toward the policy program that was measured in Study 4. The items in the policy support scale to benefit the well-being of the U.S. and the items in the policy support scale to bolster security for the U.S. were not amended. Unlike the scale that measured support for harsh policies toward the Islamic group in Study 4, this study modified the scale such that the outgroup referred to foreign organizations that may threaten U.S. national security. This scale was used to measure the motive for outgroup aggression.

Ingroup benefit policy appraisal. The 4-item scale that was used in Study 4 was revised to measure how much concern, empathy, and compassion for the welfare of the U.S. might the policies to benefit the well-being of Americans reflect. Participants rated the items on a scale of 1 (*No concern for Americans/America*) to 10 (*Strong concern for Americans/America*). Higher scores indicated stronger attributions of the policy programs reflecting concern for the welfare of America. The Cronbach's α of the final scale was .89.

Ingroup defence policy appraisal. The 4-item scale that was used in Study 4 was amended to measure how much concern, empathy, and compassion for the welfare of the U.S. might the policies to bolster security for the U.S. reflect. Participants rated the items on a scale of 1 (*No concern for Americans/America*) to 10 (*Strong concern for Americans/America*). Higher scores indicated stronger attributions of the policy programs reflecting concern for the welfare of America. The Cronbach's α of the final scale was .71.

Outgroup harm policy appraisal. Participants responded to five items that asked how much concern, empathy, and compassion for the welfare of the U.S. might the policies to restrict foreign organizations that threaten U.S. national security reflect. Examples of the items were "*Conduct hacking and cyberattacks that destroy classified databases and malfunctions software systems of foreign organizations that threaten national security*" and "*Engage military and missile attacks to contain foreign organizations that threaten national security*". Participants rated the items on a scale of 1 (*No concern for Americans/America*) to 10 (*Strong concern for Americans/America*). Higher scores indicated stronger attributions of the policy programs reflecting concern for the welfare of the U.S. The Cronbach's α of the final scale was .85.

Forced-choice policy support. Participants were told that the government funds were limited and were asked to indicate how supportive were they of allocating these funds for three specific policy programs. The three policy programs were to (1) increase the quality of life and welfare of the U.S. which represented ingroup benefit, (2) improve the security and safety of U.S. which represented ingroup defence, and (3) eliminate foreign organizations that threaten U.S. national security and to restrict their growth and power which

represented outgroup harm. Participants provided their level of support for each program using a scale of 1 (*Not at all supportive*) to 100 (*Very supportive*) and were informed that the level of support for all three programs should total to 100. Higher scores indicated stronger support for a specific policy program.

Vengeance. The vengeance scale (Stuckless & Goranson, 1992) utilized in Study 4 was used to measure vengeance. The Cronbach's α of the final scale was .94.

Covariate items. All participants responded to the covariate items. Participants were asked to answer a one-item scale about their political ideology. The item, "*On a scale from liberal to conservative, how liberal or conservative are you?*", was measured using a scale of 0 (*Liberal*) to 100 (*Conservative*). Participants responded to an item that asked how concerned they were about current pollutions levels in the U.S. This item was measured using a scale of 0 (*Not at all concerned*) to 100 (*Extremely concerned*). Participants answered an item on how supportive they were toward pro-environmental groups and activities. This item was measured using a scale of 1 (*Strongly oppose*) to 7 (*Strongly support*). Participants responded to an item that asked how concerned they were about China posing as a threat to the U.S. This item was measured using a scale of 0 (*Not at all concerned*) to 100 (*Extremely concerned*). Participants answered an item on "*How familiar are you with the on-going developments of U.S. – China bilateral relations?*", that probed their awareness of the current issues between China and the U.S. The item was measured on a scale from 1 (*Not at all*) to 7 (*Extremely*).

7.3.4. Procedure

After obtaining informed consent, participants were randomly assigned to read one of the articles on the natural disaster that discussed either about shared pain and sacrifices made by Americans or scientific facts. After reading, participants answered the readiness to self-sacrifice scale and identity fusion scale. They were randomly assigned to read a vignette that described either current pollution issues in the U.S. or current developments in China. Participants completed the feeling thermometer scale, anticipations of outgroup hostility scale, a series of policy support measures, self-report scales, covariate items, and demographic questions before being debriefed and asked to submit the survey code for payment verification.

7.4. Results

7.4.1. Manipulation checks

To test the effectiveness of the readiness to self-sacrifice manipulation, a *t*-test was used to compare the level of willingness to self-sacrifice for the U.S. between participants in the two conditions. There were no significant differences in the willingness to self-sacrifice for America between participants who were primed with high ($n = 192$; $M = 2.82$, $SD = 1.26$) or low readiness to self-sacrifice ($n = 184$; $M = 2.80$, $SD = 1.29$), $t(374) = -.15$, $p = .88$. To test the effectiveness of the group context manipulation, participants were asked to rate how concerned they were about China posing as a threat to the U.S. and how concerned they were about current pollution levels in the U.S., on a scale that ranged from 0 (*Not at all concerned*) to 100 (*Extremely concerned*). Higher scores indicated higher levels of concern toward the outgroup. There was no

significant difference in ratings of concern toward China posing as a threat to the U.S., between participants in the intergroup context ($n = 191, M = 42.20, SD = 25.49$) and the intragroup context ($n = 185, M = 45.37, SD = 25.85$), $t(374) = 1.20, p = .23$. There was no significant difference in ratings of concern toward current pollution issues in the U.S., between participants in the intergroup context ($M = 72.70, SD = 22.37$) and the intragroup context ($M = 70.81, SD = 24.31$), $t(374) = -.78, p = .43$.

7.4.2. Correlations between mean self-sacrificial readiness and mean policy support measures

Correlation results indicated that there were moderate associations between self-sacrificial readiness and policy support toward ingroup benefit, ingroup defence, and outgroup harm, $r_s(376) < .33, p_s < .01$. Table 10 presents the correlations between mean self-sacrificial readiness and mean policy support for ingroup benefit, ingroup defence, and outgroup harm in Study 5.

Table 10

Correlation coefficients of mean self-sacrificial readiness and mean policy support for ingroup benefit, ingroup defence, and outgroup harm.

	1	2	3	4
1. Self-sacrificial readiness	1			
2. Mean support for ingroup benefit policies	-.13*	1		
3. Mean support for ingroup defence policies	.27***	.26***	1	

4. Mean support for outgroup harm policies	.33***	-.14**	.65***	1
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* $p \leq .05$, ** $p \leq .01$, *** $p \leq .001$.

7.4.3. Means comparisons of appraisals of policy support toward the U.S. (ingroup) and foreign organizations that may threaten U.S. national security (outgroup)

A 2x2 between-subjects, ANOVA was used to analyze the effects of readiness to self-sacrifice and type of group context on appraisals of policy support toward ingroup benefit¹⁰, ingroup defence¹¹, outgroup aggression¹² as well as forced-choice policy measures. The two items on familiarity with developments in China and support for pro-environmental groups were included as covariates. This analysis was preregistered. There was no significant main effect of readiness to self-sacrifice on the outcome variables, $F_s(1, 370) > .02$, $p_s > .07$. There was a significant main effect of the type of group context on appraisal of ingroup defence policies, $F(1, 370) = 4.93$, $p = .03$. Participants in the intergroup context ($M = 6.27$, $SD = .14$) were more inclined to perceive ingroup defence policies as measures reflecting concern and compassion for the U.S., compared to the control condition ($M = 5.81$, $SD = .15$). There was a significant main effect of the type of group context on the appraisal of outgroup aggression, $F(1, 370) = .748$, $p = .007$. Participants in the intergroup context ($M = 4.56$, $SD = .16$) were more inclined to perceive outgroup harm policies as measures

¹⁰Ingroup benefit policies refer to policies that benefit the welfare of the U.S.

¹¹Ingroup defence policies refer to policies that bolster the security of the U.S.

¹²Outgroup harm policies refer to restrictive policies toward foreign organizations that threaten U.S. national security.

reflecting concern and compassion for the U.S., compared to the control condition ($M = 3.95$, $SD = .16$), $p = .01$. There were no significant interaction effects on the outcome variables, $F_s(1, 295) > .48$, $p_s > .06$.

7.4.4. Moderated mediation analysis with self-sacrificial readiness conditions predicting appraisals of policy programs

The full dataset with all 376 participants were split into two, separate datasets based on the type of group context, in order to conduct the moderated mediation analyses that were employed to test Hypotheses 5a to 5c. These analyses were preregistered.

Intergroup context. The pre-registered and hypothesized relationships from self-sacrificial readiness conditions (high self-sacrificial readiness = 1, low self-sacrificial readiness = 0) \rightarrow self-sacrificial readiness \rightarrow anticipations of outgroup hostility \rightarrow appraisal of policy programs (appraisals of policy support toward ingroup benefit, ingroup defence, outgroup aggression) was tested using a moderated serial mediation analysis. This analysis utilized the bias-corrected bootstrapping approach with 10,000 bootstrap samples (Hayes, 2013; PROCESS Model 91). The familiarity with developments in China was used as a covariate. The direct effect for the pathway from self-sacrificial readiness conditions (high self-sacrificial readiness = 1, low self-sacrificial readiness = 0) \rightarrow self-sacrificial readiness \rightarrow anticipations of outgroup hostility \rightarrow appraisal of outgroup harm policies as concern for the U.S. was not significant, $b = .23$, $SE = .32$, 95% C.I. [-.40, .86]. The overall model with readiness to self-sacrifice conditions as the predictor was not significant, $R^2 = .01$, $F(2, 188) = .91$, $p = .40$. The readiness to self-sacrifice conditions did not

predict self-sacrificial readiness, $b = -.16$, $SE = .17$, 95% C.I. [-.50, .18]. The overall model with the interaction term of self-sacrificial readiness and vengeance as the predictor was not significant, $R^2 = .08$, $F(5, 185) = 3.23$, $p = .008$. The interaction between self-sacrificial readiness and vengeance did not significantly predict anticipations of outgroup hostility, $b = .04$, $SE = .07$, 95% C.I. [-.09, .17]. The overall model with anticipations of outgroup hostility as the predictor was significant, $R^2 = .13$, $F(4, 186) = 7.23$, $p < .001$. Anticipations of outgroup hostility predicted appraisal of outgroup harm policies as actions of concern for the U.S., $b = .31$, $SE = .13$, 95% C.I. [.05, .56]. The pathway with self-sacrificial readiness conditions as the antecedent variable was not significant for outcome variables such as the appraisals of ingroup benefit and ingroup defence policies as actions of concern for the U.S. For the outcome variable of appraisal of support for ingroup defence policies, the overall model with anticipations of outgroup hostility as the predictor was significant, $R^2 = .13$, $F(4, 186) = 6.87$, $p < .001$. Anticipations of outgroup hostility did not predict appraisal of ingroup defence policies as actions of concern for the U.S., $b = .04$, $SE = .11$, 95% C.I. [-.18, .26]. For the outcome variable of appraisal of ingroup benefit policies, the overall model with anticipations of outgroup hostility as the predictor was not significant, $R^2 = .02$, $F(4, 186) = 1.13$, $p = .34$. Anticipations of outgroup hostility did not predict appraisal of ingroup benefit as actions of concern for the U.S., $b = -.09$, $SE = .14$, 95% C.I. [-.36, .19].

Hypothesis 5 (hypotheses 5a-c), which predicted that individuals who were primed with self-sacrificial readiness and the presence of ambiguous outgroup threat in an intergroup context will be associated with stronger levels of attributions of outgroup harm policies as measures that are motivated by

concern and compassion for the ingroup, through increased self-sacrificial readiness and anticipations of outgroup hostility, was not supported. In this model, the relationship between self-sacrificial readiness and anticipations of outgroup hostility was not moderated by vengeance. Similar results were obtained when the three, forced-choice policy support categories on ingroup benefit¹³, ingroup defence¹⁴, and outgroup harm¹⁵ were used as the outcome variables. Anticipations of outgroup hostility did not predict forced-choice support for the three policy categories, $b = -.55$, $SE = 1.23$, 95% C.I. [-2.99, 1.88]. Anticipations of outgroup hostility did not predict forced-choice support for ingroup defence policies, $b = -.75$, $SE = .88$, 95% C.I. [-2.48, .99]. Anticipations of outgroup hostility did not predict forced-choice support for outgroup harm policies, $b = 1.30$, $SE = .82$, 95% C.I. [-.31, 2.91].

7.4.5. Serial mediation analysis with identity fusion predicting forced-choice support for policy programs

Based on the moderated mediation results, identity fusion was employed as the initial variable in subsequent analyses to examine an alternative model. The results of Studies 1 and 4 showed that identity fusion predicted self-sacrificial readiness, supporting the notion that highly fused individuals would become highly self-sacrificial. In Study 5, readiness to self-sacrifice for the U.S. was predicted to mediate the relationship between fusion with the U.S. and

¹³ Forced-choice policy support for ingroup benefit refer to support for policies that benefit the welfare of U.S.

¹⁴ Forced-choice policy support for ingroup defence refer to support for policies to bolster security for the U.S.

¹⁵ Forced-choice policy support for outgroup harm refer to support for harsh policies to restrict foreign organizations that may threaten U.S. national security.

anticipations of harm. Inferring from the theoretical and empirical observations, self-sacrificial readiness would serve as a mediator between fusion with the U.S. and anticipations of harm, than as a moderator. Highly fused Americans would mostly likely seek to protect their nation and people from potential threats, which motivates them to self-sacrifice so as to remove these threats. When encountering the developments of China that may pose as an ambiguous danger, highly self-sacrificing Americans may perceive the outgroup as a potential threat which directly produces anticipations of hostility. Attributions of outgroup harm policies as concern for the U.S was predicted to mediate the relationship between anticipations of harm and support for outgroup harm policies. Viewing the outgroup as a source of potential harm, members may evaluate that the effective approach to mitigate this threat would be to terminate the outgroup than solely enhancing the instrumental welfare of the ingroup. By lowering or removing the threat, the ingroup would be better protected. Individuals who anticipate harm for the ingroup would be more likely to view outgroup harm actions as concern for the ingroup, and become more likely to endorse policies that are focused on outgroup harm.

The two readiness to self-sacrifice conditions (readiness to self-sacrifice: high vs. low) were merged and treated as a covariate in the following analyses as there was no significant means difference between the conditions. Vengeance was not included as a moderator in the ensuing analyses. An alternative model with the following associations was tested: identity fusion → self-sacrificial readiness → anticipations of harm → appraisal of outgroup harm policies as concern for the U.S. → forced-choice support for outgroup harm policies (see Figure 26). This alternative model was tested separately using the

datasets for the intragroup and intergroup contexts. Thus, serial mediational analyses were conducted as exploratory tests of the alternative model.

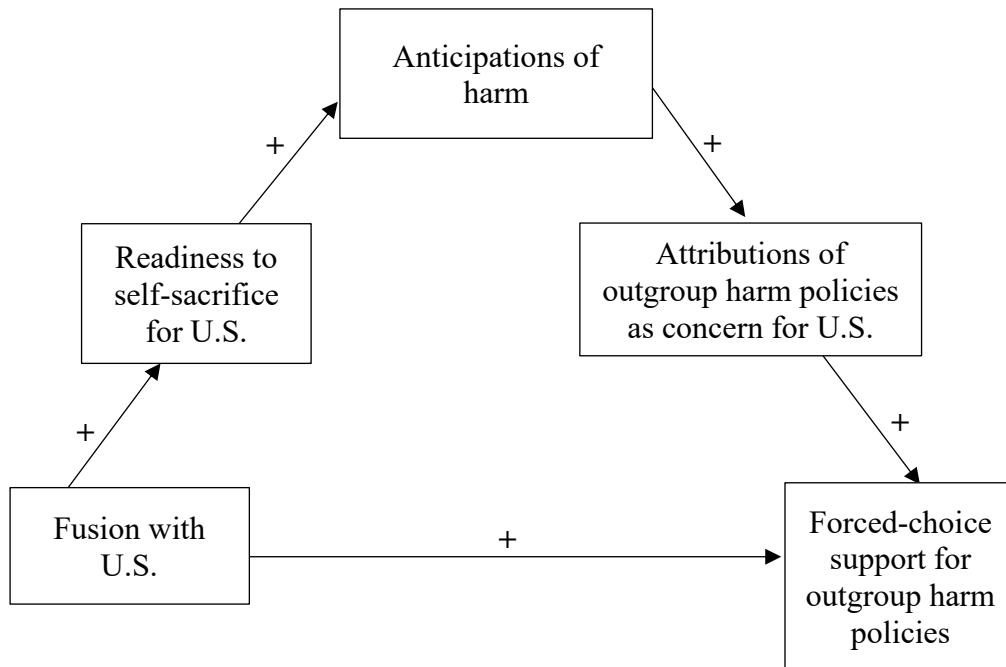


Figure 26. Serial mediational model with self-sacrifice readiness, anticipations of harm, and appraisals of outgroup harm policies as actions of care for the U.S., mediating the relationship between identity fusion and forced-choice support for outgroup harm policies, with readiness to self-sacrifice conditions and familiarity of developments in China as covariates.

Intergroup context. The conceptualized relationships between identity fusion → self-sacrificial readiness → anticipations of outgroup hostility → appraisal of outgroup harm policies as concern for the U.S. → forced-choice support for outgroup harm policies was examined using a serial mediation analysis. This analysis employed the bias-corrected bootstrapping approach with 10,000 bootstrap samples (Hayes, 2013; PROCESS Model 6). The direct effect for the hypothesized pathway from identity fusion → forced-choice

support for outgroup harm policies was not significant, $b = .72$, $SE = 1.03$, 95% C.I. [-1.32, 2.76]. The familiarity with current developments in China and the readiness to self-sacrifice conditions were controlled for. The overall model with identity fusion as the predictor was significant, $R^2 = .44$, $F(3, 187)$, $p < .001$. Identity fusion predicted readiness to self-sacrifice, $b = .72$, $SE = .06$, 95% C.I. [.60, .84]. The overall model with readiness to self-sacrifice as the predictor was significant, $R^2 = .07$, $F(4, 186) = 3.41$, $p = .01$. Readiness to self-sacrifice predicted anticipations of outgroup hostility, $b = .18$, $SE = .09$, 95% C.I. [.007, .37]. The overall model with anticipations of outgroup hostility as the predictor was significant, $R^2 = .14$, $F(5, 185) = 6.02$, $p < .001$. Anticipations of outgroup hostility predicted appraisal for outgroup harm policies as actions of concern for the U.S., $b = .28$, $SE = .13$, 95% C.I. [.02, .54]. The overall model with appraisal for outgroup harm policies as the predictor was significant, $R^2 = .32$, $F(6, 184) = 14.11$, $p < .001$. Appraisal for outgroup harm policies as actions of concern for the U.S. predicted forced-choice support for outgroup harm policies, $b = 2.50$, $SE = .41$, 95% C.I. [1.68, 3.31].

This pathway was significant for forced-choice support to increase the welfare of Americans and forced-choice support to bolster security for Americans/America. In the pathway from identity fusion → self-sacrificial readiness → anticipations of outgroup hostility → appraisal of outgroup harm policies as concern for the U.S. → forced-choice support for ingroup benefit policies, the model with appraisal for outgroup harm policies as the predictor was significant, $R^2 = .36$, $F(6, 184) = 17.17$, $p < .001$. Appraisal for outgroup harm policies as actions of concern for the U.S. negatively predicted forced-choice support for ingroup benefit policies, $b = -4.48$, $SE = .61$, 95% C.I. [-5.68,

-3.28]. In the pathway from identity fusion → self-sacrificial readiness → anticipations of outgroup hostility → appraisal of outgroup harm policies as concern for the U.S. → forced-choice support for ingroup defence policies, the overall model with appraisal for outgroup harm policies as the predictor was significant, $R^2 = .14$, $F(6, 184) = 5.19$, $p < .001$. Appraisal for outgroup harm policies as actions of concern for the U.S. predicted forced-choice support for ingroup defence policies, $b = 1.98$, $SE = .48$, 95% C.I. [1.05, 2.92] (see Figure 27). Compared to the coefficient of the outcome variable on forced-choice support for outgroup harm policies ($b = 2.50$), the coefficient of the outcome variable on forced-choice support for ingroup defence policies ($b = 1.98$) was weaker, suggesting that highly self-sacrificing members may tend to prioritize aggressive measures toward the outgroup. Table 11 presents the results of the mediational models with the appraisals of outgroup harm policies supporting the pathway in the predicted direction for outcome variables on (1) forced-choice support for ingroup benefit policies, (2) forced-choice support for ingroup defence policies, and (3) forced-choice support for outgroup harm policies. The results in Table 11 are based on the key outcomes of interest which would be support for outgroup harm policies. Individuals who appraised outgroup harm policies as actions of concern for the ingroup were more likely to support forced-choice ingroup defence and outgroup harm policies but were less likely to support ingroup benefit policies. The results of the mediational models with appraisals of ingroup benefit policies predicting (1) forced-choice support for ingroup benefit policies, (2) forced-choice support for ingroup defence policies, and (3) forced-choice support for outgroup harm policies did not support the pathway in the predicted direction and are in Appendix G. The

results of the mediational models with appraisals of ingroup defence policies predicting (1) forced-choice support for ingroup benefit policies, (2) forced-choice support for ingroup defence policies, and (3) forced-choice support for outgroup harm policies did not support the pathway in the predicted direction and are in Appendix H. There were no significant gender effects obtained.¹⁶

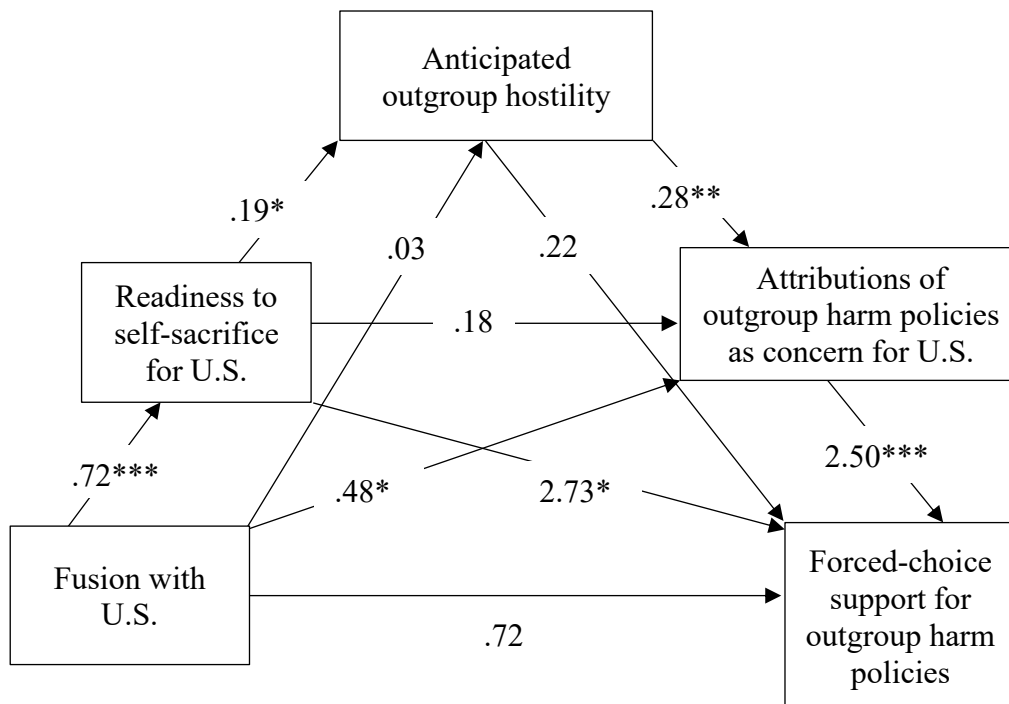


Figure 27. Self-sacrifice readiness, anticipations of outgroup hostility, and appraisals of outgroup harm policies as actions of care for the U.S., mediating the relationship between identity fusion and forced-choice support for outgroup harm policies with readiness to self-sacrifice conditions and familiarity of developments in China as covariates. * $p \leq .05$, ** $p \leq .01$, *** $p \leq .001$.

¹⁶ The gender variable was not a key factor of analysis in this study. However, gender was submitted as a covariate in moderated mediational analyses using identity fusion conditions as the independent variable and forced-choice support for outgroup harm policies as the dependent variable. Results showed that for the intergroup context, the hypothesized serial mediational pathway from identity fusion to support for outgroup harm was significant, $p_s < .05$. Similar results were obtained when ingroup defence and ingroup benefit forced-choice policy support based on the intra- and intergroup contexts were used as outcome variables.

Table 11

Regression coefficients of mediational analyses with appraisals of outgroup harm policies predicting forced-choice policy support categories in the intergroup context

	B	S.E	<i>t</i>	95% C.I.
Mediator variable models				
Readiness to self-sacrifice				
Constant	.75**	.25	3.01	.26, 1.25
Identity fusion	.72***	.06	12.00	.61, .84
Familiarity with				
current developments	-.02	.04	-.40	-.10, .07
in China (covariate)				
Readiness to self-				
sacrifice conditions	.06	.14	.43	-.22, .34
(covariate)				
$F(3, 187) = 47.99***$				
$R^2 = .44$				
	B	S.E	<i>t</i>	95% C.I.
Anticipations of outgroup hostility				
Constant	2.68***	.32	8.33	2.04, 3.31
Identity fusion	.04	.10	.39	-.16, .24
Readiness to self-				
sacrifice	.19*	.09	2.05	.004, .37

Familiarity with				
current developments	.10	.06	1.80	-.01, .21
in China (covariate)				
Readiness to self-				
sacrifice conditions	-.16	.18	-.92	-.51, .19
(covariate)				
$F(4, 186) = 3.40^{**}$				
$R^2 = .07$				
	B	S.E	<i>t</i>	95% C.I.
Appraisal of outgroup harm policies				
Constant	1.69*	.68	2.50	.36, 3.03
Identity fusion	.48**	.18	2.65	.12, .84
Readiness to self-				
sacrifice	.18	.17	1.09	-.15, .51
Anticipations of				
outgroup hostility	.28*	.32	.68	-.41, .85
Familiarity with				
current				
developments in	-.07	.11	-.67	-.27, .13
China (covariate)				
Readiness to self-				
sacrifice conditions	.22	.32	.68	-.41, .85
(covariate)				
$F(5, 185) = .6.02$				

$R^2 = .14$				
	B	S.E	<i>t</i>	95% C.I.
Dependent variable models				
(1) Forced-choice support for ingroup benefit policies				
Constant	84.63***	5.69	14.86	73.39, 95.86
Identity fusion	-2.77	1.52	-1.82	-5.78, .23
Readiness to self-sacrifice	-2.42	1.38	-1.75	-5.15, .31
Anticipations of outgroup hostility	1.10	1.10	1.00	-1.07, 3.28
Appraisal of outgroup harm policies	-4.48***	.61	-7.38	-5.68, -3.28
Familiarity with current developments in China (covariate)	.76	.83	.92	-.88, 2.41
Readiness to self-sacrifice conditions (covariate)	.28	2.65	.11	-4.94, 5.51
$F(6, 184) = 17.17***$				
$R^2 = .36$				
	B	S.E	<i>t</i>	95% C.I.

(2) Forced-choice support for ingroup defence policies				
	B	S.E	<i>t</i>	95% C.I.
Constant	19.87***	4.45	4.46	11.08, 28, 66
Identity fusion	2.06	1.19	1.73	-.29, 4.41
Readiness to self-sacrifice	-.31	1.08	-.28	-2.44, 1.82
Anticipations of outgroup hostility	-1.32	.86	-1.52	-3.18, 5.00
Appraisal of outgroup harm policies	1.98***	.48	4.17	1.05, 2.92
Familiarity with current developments in China (covariate)	-.80	.65	-1.22	-2.08, .49
Readiness to self-sacrifice conditions (covariate)	.91	2.07	.44	-3.18, 5.00
$F(6, 184) = 5.19^{**}$				
$R^2 = .14$				
	B	S.E	<i>t</i>	95% C.I.
(3) Forced-choice support for outgroup harm policies				
Constant	-4.50	3.87	-1.16	-12.13, 3.13

Identity fusion	.72	1.03	.69	-1.32, 2.76
Readiness to self-sacrifice	2.73*	.94	2.90	.88, 4.59
Anticipations of outgroup hostility	.22	.75	.29	-1.26, 1.69
Appraisal of outgroup harm policies	2.50***	.41	6.05	1.68, 3.31
Familiarity with current developments in China (covariate)	.03	.57	.06	-1.09, 1.15
Readiness to self-sacrifice conditions (covariate)	-1.19	1.80	-.66	-4.74, 2.36
$F(6, 184) = 14.11***$				
$R^2 = .32$				

* $p \leq .05$, ** $p \leq .01$, *** $p \leq .001$.

Intragroup context. To test whether the relationships of the alternative model observed in the intergroup context would be similarly obtained in the intragroup context, the alternative model with the associations from identity fusion → self-sacrificial readiness → anticipations of harm to the U.S. (pollution threats) → appraisal of outgroup harm policies as concern for the

U.S. → forced-choice support for outgroup harm policies were examined using a serial mediation analysis. This analysis employed the bias-corrected bootstrapping approach with 10,000 bootstrap samples (Hayes, 2013; PROCESS Model 6). The support for pro-environmental groups and the readiness to self-sacrifice conditions were controlled for. In this pathway based on the intragroup context, anticipations of harm to the U.S. did not significantly predict appraisals of ingroup benefit, ingroup defence, and outgroup harm policies as actions of concern for the well-being of the U.S., $p_s > .05$. Separate serial mediational analyses showed that there were no significant gender differences.¹⁷ The mediational results are tabulated and presented in Appendices I to K.

7.5. Discussion

This study predicted that the readiness to self-sacrifice conditions would be associated with stronger appraisals of outgroup harm policies toward foreign organizations that threaten U.S. national security as actions motivated by concern for the U.S., through increased readiness to self-sacrifice and anticipations of outgroup hostility. The findings did not support the model as the readiness to self-sacrifice conditions did not exert the expected effects on the readiness to self-sacrifice. The finding of non-significant difference will be addressed as a limitation of this study. An alternative model was developed

¹⁷ The gender variable was not a key factor of analysis in this study. However, gender was submitted as a covariate in moderated mediational analyses using identity fusion conditions as the independent variable and forced-choice support for outgroup harm policies as the dependent variable. Results showed that gender did not have a significant effect on the relationship between identity fusion conditions and self-sacrificial readiness, $t(180) = -.53, p = .59$. Similar results were obtained when ingroup defence and ingroup benefit forced-choice policy support were used as outcome variables.

based on findings from previous studies that tested the association between identity fusion and readiness to self-sacrifice. Finding supported this model. In the intergroup context, these individuals were more likely to extend their anticipations of potential hostility from China to foreign organizations that may threaten U.S. national security and were more supportive of outgroup harm policies than ingroup benefit policies that tangibly and exclusively increase the well-being of the U.S. Moreover, this pathway was found to be significant under an ambiguous outgroup threat, suggesting that highly self-sacrificing members could be hypersensitive to minor and vague cues that connote potential danger for the ingroup and may seek to aggress against the threat rather than solely enhance instrumental benefits for the ingroup. Furthermore, the parochial cooperation and bounded generalized reciprocity theories correspondingly predicted greater support for policies to defend the ingroup or policies to enhance the welfare of the ingroup. The alternative theories may not account for the findings where highly self-sacrificing individuals were more likely to endorse policies that were aggressive toward the outgroup. In the intergroup context, the ambiguous activities and intent of China could be interpreted as a threat to the well-being of the U.S., and consequently generate anticipations of outgroup hostility among highly self-sacrificing members. Opposed to the alternative theories that predicted highly self-sacrificing members may protect the ingroup by strongly endorsing ingroup benefit policies or ingroup defence policies, such members could be propelled to remove the perceived threat (i.e., the outgroup) by engaging in aggressive actions which could more directly reduce the threat from the outgroup.

Additional support for the mechanism of anticipated outgroup hostility may be illustrated from the pathway which was not significant in the intragroup context. This finding may suggest highly self-sacrificing individuals may not readily self-sacrifice to confront ambiguous threats to the ingroup in an intragroup context. Moreover, this finding could imply that outgroup threat salience in an intergroup context could be necessary to induce anticipations of outgroup hostility which may motivate self-sacrificial tendencies to harm the outgroup.

7.6. Limitations

The manipulation to increase readiness to self-sacrifice for the U.S. may have failed as the news article compilations on the 2011 Super Outbreak incident for the control condition and the experimental condition could have evoked similar levels of readiness to self-sacrifice. Although the article for the control condition described the incident using scientific facts and structural such as wind speeds, damage to properties, and economic losses, the information may have triggered considerations about the impact of these costs on the victims and to the U.S. as a larger collective. The readiness to self-sacrifice among participants in the control condition may not have differed greatly from that of the experimental condition where participants read about other American volunteers who provided aid during the incident.

7.7. Conclusions

This study demonstrated that the proposed psychological mechanism of anticipated outgroup hostility may most likely emerge in contexts that involve

intergroup interactions. The presence of an outgroup with ambiguous intent and actions in an intergroup context may heighten anticipations of outgroup hostility which may lead to the prioritization of outgroup aggression over ingroup benefit. This model provided further conceptual replication for the positive relationship between self-sacrificing prosociality (i.e., self-sacrificial readiness) and outgroup aggression relative to ingroup benefit. In addition, this study showed that highly self-sacrificing members may tend to appraise their actions of outgroup aggression as being motivated by care and concern for the ingroup and engage in outgroup harm relative to solely and tangibly pursuing ingroup benefit, yielding further support for the positive relationship between self-sacrificing prosociality and outgroup aggression.

8. CHAPTER 8: REVERSING THE POSITIVE ASSOCIATION BETWEEN SELF-SACRIFICING PROSOCIALITY AND OUTGROUP AGGRESSION THROUGH THE ACTIVATION OF HIGH SOCIAL IDENTITY COMPLEXITY

8.1. Social identity complexity weakens the association between self-sacrificing prosociality and outgroup harm

“The clients [de-radicalized ex-Boko Haram members]-as we call them- are now better informed and transformed spiritually, socially and psychologically about their new roles in the society. They showed serious remorse for where they found themselves” (Leadership, 2018). People are simultaneously members of many different groups to which they develop a sense of identity fusion, commitment, and readiness to self-sacrifice. Whilst identity fusion emphasizes the feeling of ‘oneness’ to a single group, how one constructs and maintains a cognitive representation of his/her social group identities is germane to the social identity complexity theory (SIC; Roccas & Brewer, 2005). The social identity complexity theory posits that individuals with simple social identities identify with a single ingroup membership as the core node of all their group identities, yielding a single, highly exclusive ingroup category (Roccas & Brewer, 2005). At the high end of the social identity complexity spectrum, individuals with more complex social identities perceive their group identities as non-overlapping, uniquely distinct, and separate from one another. Seeing themselves through a complex amalgamation of different group memberships that together make up their overall social identities, these individuals acknowledge that each of their ingroup memberships consists of a different circle of people as ingroup members (Brewer & Pierce, 2005). Holding high

degrees of social identity complexity that entails multiple group memberships reduces the importance for a single group identity to define and identify an individual. The effect of social identity complexity has been assessed in the context of intergroup relations. Testing the effect of social identity complexity on attitudes about health disparities toward disadvantaged outgroup members, Prati et al. (2016) showed that participants who read about an immigrant group with multiple mixed identity categorization and reported low social identity complexity were more likely to financially support a vaccination initiative for immigrants, compared to the other conditions. Levy et al. (2019) evidenced that participants who read about individuals from mixed Serb and Bosniak families that did not perceive their identities as conflicting, reported higher levels of social identity complexity and perceived such individuals as being able to bridge the faultlines between ingroup and outgroups.

Thus far, the relationships among social identity complexity, self-sacrificial readiness, and outgroup aggression relative to instrumental ingroup benefit has not been examined empirically. Increasing the salience of different, non-converging ingroup memberships through the high activation of social identity complexity, may decrease the strength of identity fusion toward a group. Consequently, the readiness to self-sacrifice for a single ingroup and anticipations of outgroup hostility could be reduced as perceived commitments to cross-cutting categorizations of ingroups become heightened as well as outgroup members could be viewed as ingroup members (Crisp et al., 2010; Miller et al., 2009). With reduced anticipations of the outgroup as a potential threat, individuals with high social identity complexity may not be inclined toward harming the outgroup, such that support for outgroup harm could be

reversed. The purpose of this study thus aimed to examine whether activating high social identity complexity would be associated with weak support for harsh outgroup policies against an Islamic group, through decreased willingness to self-sacrifice and anticipations of outgroup hostility.

8.2. Study hypothesis

This study was pre-registered on the OSF research platform (see Appendix L). The preregistered hypothesis predicted that high SIC would report weaker support for restrictive policies on outgroup aggression, through low readiness for self-sacrifice and weaker anticipations of outgroup hostility. The relationship between readiness for self-sacrifice and anticipations of outgroup hostility is predicted to be moderated by vengeance. This hypothesis was developed *a priori* and tested in Study 6. This study will follow a between-subjects design that will consist of two conditions of social identity complexity (High vs Low). The study will recruit 200 participants, where 100 participants are assigned to each condition. To test the hypothesis, moderated mediational models will be employed in which the independent variable will be the SIC conditions and the dependent variable(s) will be support for policies relating to outgroup aggression. The first mediator will be readiness for self-sacrifice, and the second mediator will be anticipations of outgroup hostility. The moderator would be the vengeance variable. Participants with missing data and those whose nationality is not 'USA' will be excluded. Participants may also be excluded if their responses on free-response questions are irrelevant to the question or reflect misunderstanding of the question. The official pre-

registration for this study can be accessed at the following OSF link:

<https://osf.io/hjqpg>.

Compared to Americans who are primed with low social identity complexity, Americans who are primed with high social identity complexity would have heightened salience of the divergence and uniqueness of their ingroup memberships. The awareness of their other ingroup memberships may reduce their willingness to self-sacrifice for the America. This inference could be indirectly aligned with the theoretical and CSA frameworks such that highly fused individuals whose self-sacrificial readiness toward a group is reduced, may become less likely to perceive the outgroup as a threat to the ingroup, and thus become less inclined toward outgroup harm. When recognizing the differences of their ingroups, individuals who are highly self-sacrificing and hold strong retributive mindsets would become less willing to self-sacrifice and vengeful toward outgroup members. For individuals whose social identity complexity was made salient, reduced self-sacrificing prosociality may positively predict lower anticipations of outgroup hostility at high levels of vengeance. These evaluations may decrease anticipations of outgroup hostility toward the Islamic outgroup and accordingly reduce the support for implementing harsh policies against the outgroup.

Hypothesis 6: Individuals who were primed with high social identity complexity will be associated with weak support for outgroup harm policies, through decreased readiness to self-sacrifice and anticipations of outgroup hostility. In this model, the relationship between readiness to self-sacrifice and anticipations of outgroup hostility is predicted to be moderated by vengeance.

At high levels of vengeance, decreased readiness to self-sacrifice may positively predict lower anticipations of outgroup hostility.

8.3. Method

8.3.1. Participants

Two hundred American participants were recruited through Prolific online survey platform. The final sample comprised of 164 adults (51.8% women, $M_{\text{age}} = 33.44$ years, $SD_{\text{age}} = 8.70$), after excluding a total of 36 participants whose responses about the central theme of the article that they were asked to read reflected a misunderstanding of the question and were irrelevant ($n = 21$), had listed only personality characteristics such as ‘funny’, ‘kind’ and ‘hardworking’ ($n = 8$), and read the outgroup vignette under 5 seconds ($n = 7$). The majority of participants were White ($n = 119$), with 11.6% Black/African-Americans, 7.9% Asian/Asian-Americans, 5.5% Latino/Hispanic and 2.4% who stated pan-ethnic racial identifications. All participants indicated they held American citizenship. There were 37.8% of participants who stated their religious affiliation as Christianity ($n = 62$) while 31.7% ($n = 52$) indicated atheism. An *a priori* power analysis using the G*Power program indicated that, based on a linear multiple regression analysis, a sample size of 92 participants was adequate to have 80% power to detect a medium effect size of .15 at an α -level of .05.

8.3.2. Study design

This study followed a between-subjects design. The between-subjects factor was social identity complexity which consisted of two levels (social identity complexity: high vs. low). Employing the social identity complexity

manipulation by Grant and Hogg (2012), participants in the low social identity complexity group were asked to list four social group identities that they thought were important to them and were asked to describe the extent of overlap among the group identities that they indicated. Participants in the high social identity complexity group were asked to list four social group identities that they thought were important to them and to describe the extent of dissimilarity among the group identities that they indicated.

8.3.3. Material

Social identity complexity manipulation. Participants were asked to list four social group identities and to write about either how distinct or similar were the identities. Participants then answered a single item on how much they thought the identities overlapped with one another, on a scale of 1 (*Not very much*) to 9 (*Very much*). This item was reversed-scored to form a variable for the perceived distinctiveness of the ingroup memberships.

Self-sacrificial readiness. The readiness to self-sacrifice scale (Bélanger et al., 2014) utilized in Study 5 was utilized as a measure of self-sacrificial readiness in this study. The Cronbach's α of the final scale was .90. Readiness to self-sacrifice for America was reversed-scored to form a composite for unwillingness to self-sacrifice. The Cronbach's α of the final scale was .90.

Vignette of weak outgroup threat. Participants were asked to read a vignette based on a hypothetical, U.S.-based ultraorthodox Islamic group that was used in Study 4. The vignette described the group as currently losing membership strength and influence within the American society (see Appendix H).

Favourability toward outgroup. After reading the vignette, participants responded to a feeling thermometer scale, which measured the favourability toward the Islamic group, on a scale ranging from 0 (*Cold or unfavourable*) to 100 (*Warm or favourable*).

Anticipations of outgroup hostility. The items used in Study 4 were employed in this study. An item on negative expectation, “*How serious of a threat is this group to America?*”, was measured using a scale of 1 (*Not at all*) to 7 (*Very much*) and included in the composite variable for anticipations of outgroup hostility. The Cronbach’s α of the final scale was .95.

Anticipations of outgroup positivity. The six items on anticipations of outgroup hostility – hateful, harmful, hostile, serious, fearful, and worried were reverse-scored and were averaged with four items on perceptions of outgroup positivity – supportive, friendly, safe, and sympathetic – to form a composite for anticipations of outgroup positivity. Each item was measured using a scale of 1 (*Not at all*) to 7 (*Very much*). The Cronbach’s α of the final scale was .94.

Participants were asked to answer the three policy support scales that were from Study 4 and used as the primary outcome measures in this study.

Ingroup benefit policies. Participants answered four items that asked about their level of support toward allocating government funds for policies to improve the welfare of Americans. The Cronbach’s α of the final scale was .82.

Ingroup defence policies. Participants answered four items that probed their support toward allocating government funds for policies to increase security and defence measures for America. The Cronbach’s α of the final scale was .78.

Outgroup harm policies. Participants responded to six items that asked about their level of support toward allocating government funds for aggressive policies to restrict or regulate activities of the ultraorthodox Islamic group. The Cronbach's α of the final scale was .93.

Forced-choice policy support. Participants were asked to answer the forced-choice policy support scale that was used in Study 4.

Vengeance. The vengeance scale (Stuckless & Goranson, 1992) utilized in Study 5 was used to measure vengeance. The Cronbach's α of the final scale was .94.

8.3.4. Procedure

After obtaining informed consent, participants were randomly assigned to one of the two conditions of the social identity complexity manipulation. The manipulation served as a priming task to increase or reduce the salience of their multiple ingroup memberships respectively. Participants answered the readiness to self-sacrifice scale and read a vignette describing an ultraorthodox, Islamic outgroup. After reading, participants completed the feeling thermometer scale about the outgroup, anticipations of outgroup hostility scale, a series of policy support measures, self-report scales, and demographic questions before being debriefed and asked to submit their survey code for payment verification.

8.4. Results

8.4.1. Manipulation checks

To test the effectiveness of the social identity complexity manipulation, a t -test was used to compare the perceived distinctiveness among ingroup memberships

between individuals in the low and high social identity complexity conditions. There was a significant difference in the perceived distinctiveness among ingroup memberships between individuals in the low ($n = 84$, $M = 3.25$, $SD = 1.73$) and high ($n = 80$, $M = 4.46$, $SD = 1.73$) social identity complexity conditions, $t(162) = 4.48$, $p < .001$.

8.4.2. Correlations between mean self-sacrificial readiness and mean policy support measures

Correlation results indicated that there were moderate associations between self-sacrificial readiness and policy support toward ingroup benefit, ingroup defence, and outgroup harm, $r_s(164) < .18$, $p_s < .01$. Table 12 presents the correlations between mean self-sacrificial readiness and mean policy support for ingroup benefit, ingroup defence, and outgroup harm in Study 6.

Table 12

Correlation coefficients of mean self-sacrificial readiness and mean policy support for ingroup benefit, ingroup defence, and outgroup harm.

	1	2	3	4
1. Self-sacrificial readiness	1			
2. Mean support for ingroup benefit policies	-.23**	1		
3. Mean support for ingroup defence policies	.23**	.35***	1	
4. Mean support for outgroup harm policies	.18*	.08	.28***	1

* $p \leq .05$, ** $p \leq .01$, *** $p \leq .001$.

8.4.3. Means comparisons of policy support toward the U.S. (ingroup) and the Islamic group (outgroup)

An one-way, between-subjects ANOVA was used to analyze the effect of social identity complexity on policy support toward ingroup benefit¹⁸, ingroup defence¹⁹ and outgroup aggression²⁰ as well as on the forced-choice policy measures. There were no significant main effects of social identity complexity on the outcome variables, $F_s(1, 162) > 2.77, p_s > .09$.

¹⁸ Ingroup benefit policies refer to policies to enhance the well-being of the U.S.

¹⁹ Ingroup defence policies refer to policies to bolster the security of the U.S.

²⁰ Outgroup defence policies refer to policies to restrict the Islamic group.

8.4.4. Moderated mediation analysis with social identity complexity conditions predicting support for policy programs

To examine the conceptualized relationships between social identity complexity conditions (low social identity complexity = 0, high social identity complexity = 1) → readiness to self-sacrifice for America → anticipations of outgroup hostility → support for outgroup harm policies towards the Islamic outgroup, a moderated serial mediation analysis based on the bias-corrected bootstrapping approach with 10,000 bootstrap samples (Hayes, 2013; PROCESS Model 91) was employed. The moderated mediational analyses were preregistered. The direct effect for the hypothesized pathway from social identity complexity (low social identity complexity = 0, high social identity complexity = 1) → support for outgroup harm policies toward the ultraorthodox Islamic group was not significant, $b = -.65$, $SE = .35$, 95% C.I. [-1.34, .04]. The model with the social identity complexity conditions as the predictor was not significant, $F(1, 162) = .01$, $p = .92$. Social identity complexity conditions did not predict readiness to self-sacrifice, $b = .02$, $SE = .22$, 95% C.I. [-.42, .47]. Similarly, this association between social identity complexity (low social identity complexity = 0, high social identity complexity = 1) → readiness to self-sacrifice for America was not significant for the five outcome variables: (1) support for ingroup benefit policies, (2) support for ingroup defence policies, (4) forced-choice support for ingroup benefit policy program, (5) forced-choice support for ingroup defence policy program, (6) forced-choice support for outgroup harm policy program. Hypothesis 6 which predicted that individuals who were primed with high social identity complexity will be associated with weak support for aggressive policies and actions toward a hypothetical, ultraconservative Islamic group,

through decreased readiness to self-sacrifice and anticipations of outgroup hostility, was not supported.

8.4.5. Serial mediation analysis with social identity complexity conditions predicting support for policy programs

An alternative model was developed to examine the conceptualized relationships between social identity complexity conditions (low social identity complexity = 0, high social identity complexity = 1) → perceived distinctiveness among ingroup memberships → unwillingness to self-sacrifice for the U.S. → anticipations of outgroup positivity → support for outgroup harm policies towards the Islamic outgroup. Perceived distinctiveness of ingroup memberships was reversed-scored based on the single item used as a manipulation check on the perceived overlap of the ingroup memberships after participants answered the social identity complexity manipulation task. Readiness to self-sacrifice for the U.S. was reversed-scored to form a composite variable for unwillingness to self-sacrifice. Six items on perceptions of outgroup hostility – hateful, harmful, hostile, serious, fearful, and worried were reverse-scored and were averaged with four items on perceptions of outgroup positivity – supportive, friendly, safe, and sympathetic – to form a composite variable for anticipations of outgroup positivity. The composite variable for anticipations of outgroup positivity was created to represent how favourable the outgroup was perceived, which would reflect the flipside of the variable of anticipations of outgroup hostility that denoted how threatening the outgroup was perceived. These serial mediational analyses were conducted as exploratory tests of the alternative model. A serial mediation analysis based on the bias-

corrected bootstrapping approach with 10,000 bootstrap samples (Hayes, 2013; PROCESS Model 6) was employed. The direct effect for the hypothesized pathway from social identity complexity conditions (low social identity complexity = 0, high social identity complexity = 1) → support for outgroup harm policies toward the ultraorthodox Islamic group was not significant, $b = -.70$, $SE = .37$, 95% C.I. [-1.43, .03]. The overall model with social identity complexity conditions as a predictor was significant, $R^2 = .11$, $F(1, 162) = 20.10$, $p < .001$. Social identity complexity manipulation significantly predicted perceived distinctiveness among ingroup memberships, $b = 1.21$, $SE = .27$, 95% C.I. [.68, 1.75]. The overall model with perceived distinctiveness among ingroup memberships was significant, $R^2 = .04$, $F(2, 161) = 3.40$, $p = .04$. Perceived distinctiveness among ingroup memberships significantly predicted unwillingness to self-sacrifice for the U.S., $b = .17$, $SE = .06$, 95% C.I. [.04, .29]. The overall model with unwillingness to self-sacrifice for America as the predictor was significant, $R^2 = .05$, $F(3, 160) = 2.84$, $p = .04$. Unwillingness to self-sacrifice for America significantly predicted anticipations of outgroup positivity, $b = .22$, $SE = .08$, 95% C.I. [.07, .38]. The overall model with anticipations of outgroup positivity as a predictor was significant, $R^2 = .24$, $F(4, 159) = 12.23$, $p < .001$. Anticipations of outgroup positivity significantly predicted weak support for outgroup harm policies against the Islamic group, $b = -.78$, $SE = .13$, 95% CI [-1.03, -.53] (see Figure 28). The pathway was found to be significant for forced-choice support for the ingroup benefit and outgroup harm policy programs.

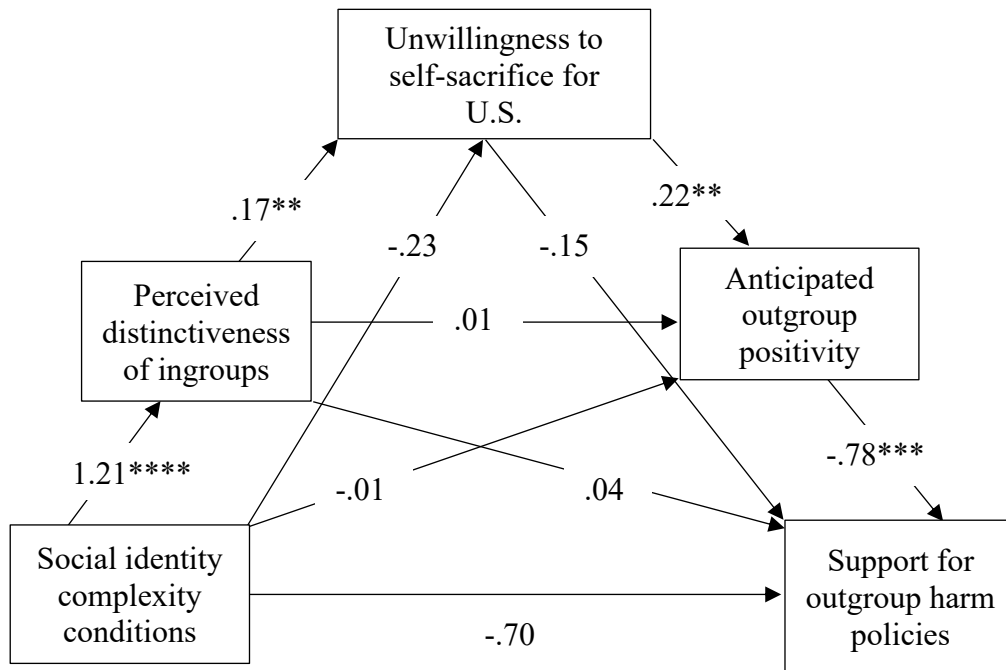


Figure 28. Perceived distinctiveness of ingroups, unwillingness to self-sacrifice, and anticipations of outgroup positivity mediating the relationship between social identity complexity conditions and support for outgroup harm policies. * $p \leq .05$, ** $p \leq .01$, *** $p \leq .001$.

Additional mediational analyses were conducted using five different outcome variables which were (1) support for outgroup harm policies, (2) forced-choice support for ingroup benefit policy program, (3) forced-choice support for outgroup harm policy program, (4) support for ingroup benefit policies, (5) support for ingroup defence policies, and (6) forced-choice support for ingroup defence policy program. When forced-choice support for ingroup benefit policy program was used the outcome variable, the overall model with anticipations of outgroup positivity as a predictor was significant, $R^2 = .10$, $F(4, 159) = 4.52$, $p = .002$. Anticipations of outgroup positivity significantly predicted strong support for forced-choice support for ingroup benefit policy

program, $b = 2.36$, $SE = 1.17$, 95% CI [.03, 4.69], $p = .047$. When forced-choice support for outgroup harm policy program was used as the outcome variable, the overall model with anticipations of outgroup positivity as a predictor was significant, $R^2 = .18$, $F(4, 159) = 8.97$, $p < .001$. Anticipations of outgroup positivity significantly predicted weak support for forced-choice outgroup harm policy program, $b = -3.16$, $SE = .68$, 95% CI [-4.51, -1.82], $p < .001$.

The results of the mediational analyses conducted using anticipated outgroup positivity to significantly predict outcome variables on (1) support for outgroup harm policies, (2) forced-choice support for ingroup benefit policy program, (3) forced-choice support for outgroup harm policy program are presented in Table 13. The results in Table 13 are based on the key outcomes of interest which would be support for outgroup harm policies. These results demonstrated support for the pathway in the predicted direction, such that individuals with high social identity complexity may produce greater support for ingroup benefit and lower support for outgroup harm, through increased unwillingness to self-sacrifice and anticipations of outgroup positivity. The results of the mediational analyses conducted using outcome variables on (4) support for ingroup benefit policies, (5) support for ingroup defence policies, and (6) forced-choice support for ingroup defence policy program did not support the pathway in the predicted direction and are in Appendix I. There were no significant gender effects observed.²¹

²¹ The gender variable was not a key factor of analysis in this study. However, gender was submitted as a covariate in moderated mediational analyses using identity fusion conditions as the independent variable and support for outgroup harm policies as the dependent variable. Results showed that only the overall model with unwillingness to sacrifice for the U.S. as the predictor was marginally significant, $R^2 = .05$, $F(159) = 2.15$, $p = .077$. Unwillingness to self-sacrifice positively predicted anticipations of outgroup positivity, $b = .22$, $t(159) = 2.68$, $p = .008$. The other overall models and associations in this pathway were found to be significant, $p_s < .05$. Similar results were

Table 13

Regression coefficients of mediational analyses with unwillingness to self-sacrifice and anticipations of outgroup positivity mediating the relationship between social identity complexity and outcome measures

	B	S.E	<i>t</i>	95% C.I.
Mediator variable models				
Perceived distinctiveness of ingroup memberships ²²				
Constant	3.25***	.19	17.20	2.88, 3.62
Social identity				
complexity	1.21***	.27	4.48	.68, 1.75
conditions				
$F(1, 162) = 20.10***$				
$R^2 = .11$				
Unwillingness to self-sacrifice ²³				
Constant	4.54***	.26	17.52	4.03, 5.05
Social identity				
complexity	-.23	.23	-.97	-.69, .24
conditions				

obtained when ingroup defence and ingroup benefit policy support were used as outcome variables.

²² Perceived distinctiveness of ingroup memberships was reverse-scored based on the single item used as a manipulation check on the perceived overlap of the ingroup memberships after participants answered the social identity complexity manipulation task.

²³ Readiness to self-sacrifice for U.S. was reverse-scored to form a composite variable for unwillingness to self-sacrifice.

Perceived				
distinctiveness of				
ingroup	.17**	.06	2.61	.04, .29
memberships				
$F(2, 161) = 3.40^*$				
$R^2 = .04$				
Anticipations of outgroup positivity ²⁴				
Constant	2.30***	.44	5.22	1.43, 3.17
Social identity				
complexity	-.006	.23	-.03	-.47, .46
conditions				
Perceived				
distinctiveness of				
ingroup	.01	.07	.23	-.11, .14
memberships				
Unwillingness to				
self-sacrifice	.22**	.08	2.81	.07, .38
$F(3, 160) = 2.84^*$				
$R^2 = .05$				
Dependent variable models				
(1) Support for outgroup harm policies				

²⁴ Six items on perceptions of outgroup hostility – hateful, harmful, hostile, serious, fearful, and worried were reverse-scored and were averaged with four items on perceptions of outgroup positivity – supportive, friendly, safe, and sympathetic – to form a composite variable for anticipations of outgroup positivity.

Constant	5.50***	.76	7.27	4.01, 7.00
<hr/>				
Social identity				
complexity	-.70	.37	-1.88	-1.43, .03
<hr/>				
Perceived				
distinctiveness of				
ingroup	.04	.10	.39	-.16, .24
memberships				
<hr/>				
Unwillingness to				
self-sacrifice	-.15	.13	-1.19	-.40, .10
<hr/>				
Anticipations of				
outgroup	-.78***	.13	-6.21	-1.03, -.53
positivity				
<hr/>				
$F(4, 159) = 12.23***$				
<hr/>				
$R^2 = .24$				
<hr/>				
(2) Forced-choice support for ingroup benefit policies				
<hr/>				
Constant	35.59***	7.11	5.01	21.55, 49.63
<hr/>				
Social identity				
complexity	3.70	3.49	1.06	-3.19, 10.59
conditions				
<hr/>				
Perceived				
distinctiveness of				
ingroup	-.63	.97	-.65	-2.55, 1.29
memberships				
<hr/>				

Unwillingness to self-sacrifice	3.75**	1.20	3.12	1.38, 6.12
Anticipations of outgroup positivity	2.36*	1.18	2.00	.03, 4.69
$F(4, 159) = 4.52^{**}$				
$R^2 = .10$				
(3) Forced-choice support for outgroup harm policies				
Constant	23.51	4.11	5.72	15.40, 31.62
Social identity complexity conditions	-2.92	2.02	-1.45	-6.90, 1.07
Perceived distinctiveness of ingroup memberships	1.36*	.56	2.41	.24, 2.47
Unwillingness to self-sacrifice	-1.54*	.69	-2.23	-2.92, -.17
Anticipations of outgroup positivity	-3.16***	.68	-4.65	-4.51, -1.82
$F(4, 159) = 8.97^{***}$				
$R^2 = .18$				

* $p \leq .05$, ** $p \leq .01$, *** $p \leq .001$.

8.5. Discussion

The study hypothesized that individuals primed with high social identity complexity will be associated with weak support for aggressive policies and actions toward a hypothetical, ultraconservative Islamic group, through decreased willingness to self-sacrifice and anticipations of outgroup hostility. The findings did not support the hypothesized model. An alternative model that excluded the vengeance variable but incorporated the variable on perceived distinctiveness among ingroup memberships as the first mediator in the pathway, was developed and tested. Findings supported this model. Individuals in high social identity complexity were more likely to show weak support for outgroup harm policies, through acknowledging the non-convergence of their various group identities, increased unwillingness to self-sacrifice for America, and anticipations of outgroup positivity.

Although this model was not significant for ingroup benefit and ingroup defence policies, the model was found to be significant for the forced-choice support for outgroup harm policies and ingroup benefit policies. These findings demonstrated support for the proposed mechanism of anticipated outgroup hostility in a reversed direction where increasing unwillingness to self-sacrifice (or lower self-sacrificial readiness) may correspondingly increase anticipations of outgroup positivity (or lower anticipations of outgroup hostility), which may lead to the prioritization of ingroup benefit (or reduced prioritization of outgroup harm), even when the outgroup was described as a potentially weak threat to the ingroup. The theory of parochial cooperation and the theory of bounded generalized reciprocity propose that individuals with high self-sacrificial readiness for their group are motivated to maximize intergroup

differences and enhance ingroup welfare respectively. In keeping with the theories, individuals with high SIC would likely be less self-sacrificing for a single ingroup and may not pursue to help a particular ingroup, in which support for ingroup benefit and ingroup defence policies would be diminished. Thus, these alternative theories may not be able to explain these findings on how increased motivations for ingroup benefit could result from individuals with reduced self-sacrificial readiness toward the ingroup. In contrast to the theories, the findings are consistent with the predictions of the CSA framework, where members with low (high) self-sacrificial readiness toward a group, would be less (more) likely to anticipate hostility from an outgroup and subsequently become less (more) inclined to harm the outgroup.

8.6. Limitations

The findings in this study did not support the pre-registered model that involved the association from social identity complexity to readiness to self-sacrifice as well as the interaction between the readiness to self-sacrifice and vengeance variables on anticipations of outgroup hostility. The association from social identity complexity to unwillingness to self-sacrifice (readiness to self-sacrifice) was found to be mediated by perceived distinctiveness among the ingroups. In this study, vengeance which involves returning the potential or inflicted harm may not hold high relevance for individuals with high social identity complexity who might have recognized the importance of the differences among their ingroups which may be considered as outgroups on a different categorical dimension (like an U.S. national identity and a religious Muslim identity) and hence, retaliation against these ingroups which may be

regarded as potential outgroups, would not be warranted. The interaction between unwillingness to self-sacrifice (readiness to self-sacrifice) and vengeance thus may not have exerted an effect on anticipations of outgroup positivity as expected.

8.7. Conclusions

This study showed that increasing one's awareness of the differences among multiple, distinct, and cross-categorizing ingroup memberships via activating high social identity complexity may be predictive of weak support for harsh policies toward outgroups, through increased unwillingness to self-sacrifice and anticipations of positivity from the outgroup. This study provided indirect evidence through reversed associations for the proposed mechanism of anticipated outgroup hostility in the relationship between self-sacrificing prosociality and outgroup aggression.

9. CHAPTER 9: CONCLUSIONS

9.1. General discussion

This research examined an unsolved dilemma on why committed members who self-sacrifice to safeguard ingroup welfare in intragroup contexts may self-sacrifice to harm the outgroup rather than prioritise and continue to directly and solely benefit ingroup welfare in intergroup contexts. The findings provided behavioural evidence for the hypothesized positive relationship between self-sacrificing prosociality and outgroup aggression, in which anticipations of outgroup hostility was established as the mediating mechanism. Particularly notable was that Studies 1 to 5 demonstrated participants who were highly self-sacrificing consistently made decisions that indicated more outgroup aggression relative to tangible ingroup benefit.

In Study 1, individuals who were highly fused to their group expressed greater readiness to self-sacrifice and in turn, aggress against the outgroup, in the absence of intergroup competition. Study 2 found that self-sacrificing prosociality was associated with heightened outgroup aggression among highly vengeful members, only when outgroup threat was absent. Self-sacrificing prosociality was associated with heightened outgroup aggression among members with a strong sense of retributive justice, only when outgroup threat was low. In Study 3, self-sacrificing prosociality was associated with increased outgroup aggression, among members with high anticipations of outgroup hostility, only in the absence of outgroup threat. Study 4 showed that individuals whose U.S. identity was made salient, compared to a control condition, were more likely to report greater self-sacrificing readiness which predicted increased anticipations of outgroup hostility, and in turn, predicted

support for outgroup harm policies. The relationship between self-sacrificing prosociality and anticipations of outgroup hostility was moderated by vengeance. Study 5 found that highly self-sacrificing members in intergroup contexts were more likely to appraise outgroup aggression as actions motivated by concern for ingroup well-being and show support for aggressive measures toward outgroups over ingroup benefit, compared to highly self-sacrificing members in intragroup contexts. Reversing the effect of self-sacrificing prosociality on outgroup aggression, Study 6 showed that the activation of high social identity complexity was associated with increased support for instrumental ingroup benefit policies over outgroup harm policies, through unwillingness to self-sacrifice and anticipations of outgroup positivity.

Incorporating intra- and intergroup contexts, the evidenced, positive relationship between self-sacrificing prosociality and outgroup aggression is a novel development that stands in contrast to predicted outcomes of parochial cooperation and bounded generalized reciprocity theories (De Dreu et al., 2014; Halevy et al., 2008). The findings in this thesis challenge these theories which emphasize dominant outcomes of maximizing intergroup differences and ingroup benefit that are underpinned by the prime motive of ingroup positivity. Utilizing the minimal group approach where participants were of arbitrary group identities and did not communicate with one another, even in the absence of direct threat from the outgroup, individuals with strong self-sacrificing prosociality were willing to engage in pre-emptive outgroup aggression relative to behaviours that enhance the welfare and fitness of the ingroup. Studies 1 to 3 highlighted that the trends of willingness to sacrifice among a small number of participants were oriented towards outgroup aggression more than instrumental

ingroup benefit. Though stakes of the decision-making games in Studies 1, 2 and 3 were low and the scenarios of intergroup competition presented in the studies did not carry strong significance, the use of arbitrary group enmity was shown to be sufficient to trigger outgroup hostility without clear and direct benefits to the ingroups, even in the absence of outgroup threat.

In Studies 1 to 3, even in the clear absence of actual competition or threat from the outgroup, highly fused and self-sacrificing members who are also hypervigilant to threats may over-attribute harm from the outgroup and externalize these fears through defensive outgroup aggression. This anticipation of outgroup hostility could galvanize highly self-sacrificing members possessing retributive mindsets, to seek revenge (for transgressions from the outgroup that have not yet actually occurred) by retaliating with personally-costly, but harmful acts against the outgroup. Individuals with low self-sacrificing prosociality and retaliatory mindsets may not perceive non-threatening, intergroup situations as dangerous and may not volunteer to attack the outgroup. When the threat from the outgroup is tangible and real, most group members may be willing to engage in aggression against the outgroup regardless of self-sacrificing prosociality and identity fusion. As such, the relationship between self-sacrificing prosociality, anticipations of outgroup hostility and willingness to engage in costly outgroup aggression may only emerge when the presence of outgroup threat is ambiguous or weak.

Likewise, the mechanism of anticipated outgroup hostility was observed in intergroup contexts where the outgroups were presented as ambiguous or declining threats to the ingroup. Highly self-sacrificing members who tend to be protective of their group and hypervigilant to possible threats were more likely

to perceive the ambiguity and weakening of outgroups as cues of danger and anticipated potential hostility from the outgroup, suggesting that the salience of outgroup threat even at a minimal level may trigger the mechanism of anticipated outgroup hostility. In an intragroup context with a (non-outgroup) threat to the ingroup, participants were not likely to favour outgroup aggression over ingroup benefit, suggesting that the mechanism of anticipated outgroup hostility may transpire when outgroup threat is made salient. Increasing the elaborative awareness of multiple ingroup memberships through social identity complexity allows one to perceive outgroup members as part of the ingroups as well as may remind the commitments to the varied, non-converging groups. In an intergroup context where the outgroup was portrayed to have deteriorating threat capacity, the activation of high social identity complexity may reduce the readiness to self-sacrifice for a specific ingroup and generate similar, downstream effects on the mechanism of anticipated outgroup hostility and the prioritization of instrumental ingroup benefit over outgroup aggression.

The findings from Studies 1 to 6 may lend support to the proposed theoretical framework based on the identity fusion principles. Individuals who develop strong feelings of unity and ‘oneness’ with their group members perceive them as family and place great importance toward protecting their safety and security. This personal duty to safeguard the group may amplify hypervigilance to look out for potential cues of threats that could harm the group. In an intergroup context, the mere presence of the outgroup could be viewed as a signal of threat to the ingroup. Even when there is either a clear absence of direct outgroup threat (Studies 1 to 3) or an ambiguous presence of the outgroup that does not directly pose as a clear threat (Studies 4 to 6), highly

self-sacrificing members who may additionally possess retributive mindsets could anticipate potential aggression from the outgroup. These members may consequently retaliate against the outgroup to remove the threat for the ingroup. Highly self-sacrificing members could have considered harming the outgroup as a more efficient strategy to confront the threat than to only support the well-being of their ingroup.

Corresponding to Brewer's (1999) question on "why and under what conditions the formation and maintenance of ingroups and ingroup loyalty leads to negative relationships with outgroups" (pp. 432), Studies 1 to 6 contribute to a more nuanced understanding of the relationship between self-sacrificing prosociality and outgroup aggression by identifying the anticipated outgroup hostility mechanism which could be either bolstered by the mediating effect of appraisals of outgroup harm as actions of care toward the ingroup, and salience of outgroup threat in intergroup contexts, or reversed by activating high social identity complexity.

9.2. Contributions and limitations of the thesis

9.2.1. Contributions and implications

Theoretical contributions and implications. Extending extant literature about the centrality of 'ingroup love' in intergroup conflict, this study identified a potential mechanism which may "trace the steps that lead from ingroup formation to outgroup hostility" (Brewer, 2001, pp. 17). Members who strongly fuse with their ingroup may perceive themselves as being responsible for their ingroup, which gives rise to hypervigilance toward identifying potential threats and instils a high level of self-sacrificing prosociality. In line with the

mechanism of anticipations of outgroup hostility, the ambiguous presence of an outgroup, that may not clearly threaten the ingroup, could prompt the defensive mindset of a highly self-sacrificing member to cognize the encounter as a transgression against the ingroup. Contrary to solely increasing the instrumental benefits for the ingroup, highly self-sacrificing members may seek to preemptively incapacitate and terminate an outgroup regardless of its perceived threat severity, and would hence readily accept extreme harm and risk. From the findings, ingroup love could serve as a basis for intergroup bias that is primarily motivated by outgroup hate. Ingroup love and favouritism could be “sometimes only observable if group membership is activated by thinking about both the interaction with the ingroup and the outgroup” (Dorrough et al., 2015, pp. 1). Likewise, in an intergroup context with the salience of outgroup threat, highly self-sacrificing members were more likely to appraise actions of aggression toward the outgroup as actions that were motivated by care and concern for the ingroup but were more likely to endorse outgroup aggression over ingroup benefit.

The weakening effect of readiness to self-sacrifice for a specific ingroup through high social identity complexity may suggest that identity fusion, which is a cognitive representation of the readiness to self-sacrifice, could be similarly reduced. Individuals with high social identity complexity could extend their ingroup memberships to include new ingroup members who were previously considered as outgroup members, which may re-draw the dimensions of *us-them* categorizations. The findings from these studies may contribute to this line of research through identifying cognitive determinants like anticipations of outgroup hostility that may emerge during specific intergroup situations and

galvanize self-sacrificial members to harm outgroups than solely helping the welfare of the ingroup. The majority of current intergroup relations research has focused on how members from different groups view and feel about each other, but there is little work that examines how ingroup members may perceive their own members while in the presence of outgroups (Mead & Maner, 2012). Likewise, specific conditions where the willingness to self-sacrifice could be mobilized as well as where instrumental ingroup benefit may not be central are under-researched (Brewer, 1999). The studies in this thesis identify how highly self-sacrificing individuals may perceive and respond to different levels of outgroup threat severity, which could exert an influence on their decisions toward instrumental ingroup benefit and outgroup harm.

Practical implications. Theories from multiple fields of study such as anthropology, history, and psychology continue to be limited in their explanations for why intergroup violence are frequent as well as when and how these conflicts may intensify or abate (Lanman et al., 2018). This research could provide exploratory insights that suggest how highly fused and self-sacrificing members with vengeful mindsets may show support for and deviate from hostile actions toward the outgroup which may respectively influence conflict escalation and reconciliation. In the context of extremism, the findings might suggest that members who exhibit high levels of self-sacrificing prosociality and anticipations of outgroup hostility could be vulnerable to later stages of radicalization, as their hyperbolic sentiments of xenophobia may intensify and necessitate pre-emptive outgroup aggression like suicide bombings, hijackings, and shootings. The self-sacrificing prosociality – outgroup aggression association could thus serve as one of the many

fundamental bases that may precede and be positively strengthened by ancillary force-multipliers like hate ideologies and toxic propaganda (Ingram, 2017) as well as charismatic leadership (Hofmann, 2016).

Identifying these factors and their linkages thus may contribute toward an initial understanding in untangling the complex processes within the “psychological ecology of extremism” (Niconchuk, 2019). In the current climate of perceived ‘invasion’ and ‘replacement’ (Reicher et al., 2019), the activation of anticipated outgroup hostility may deepen polarization for individuals with high self-sacrificing prosociality who may plausibly become more outgroup-focused and initiate intergroup conflicts that may subsequently escalate into different spectrums and theatres of violence. The studies highlight the need to understand the cognitive underpinnings of self-sacrificing prosociality in intra- and intergroup contexts which could plausibly be examined through information-processing interventions aimed at identifying more complex and subtle situational cues that signal outgroup provocations as well as uncertainty for the ingroup, and thwarting cognitive exaggerations of outgroup threat for individuals who are prepared to self-sacrifice and harm in real-world intergroup conflicts. Future interventions thus could explore delineating ambiguous, situational signals indicative of threat to the ingroup arising across social, political, and religious domains that encourage outgroup harm over ingroup benefit.

9.2.2. Limitations

A potential methodological criticism regarding Studies 1 to 3 may relate to the induction of demand characteristics which could plausibly arise from the

various options presented in the decision-making games (Bardsley, 2008). Future research using the VoD and IPD-MD+C games could employ measures of inter-individual differences in relation to the allotments in different decision-making games in within-subjects study designs. This test could be used to demonstrate whether individuals do adjust their allocations between different types of games and across trials, based on their motives and personality characteristics. Future research could furthermore ascertain specific situational constraints that enable shifts in contribution behaviours and preferences, such as from selfish motives to parochial altruism to universal prosociality.

Studies 1 to 3 used a specific VoD round to represent self-sacrificing prosociality. However, there was a consistent asymmetry between members who were willing to self-sacrifice for the ingroup and members who refrained. As such, although the studies offer initial support for the role that self-sacrificing prosociality in intragroup contexts may have on intergroup aggression, future research that oversamples participants exhibiting high self-sacrificing prosociality or experimentally manipulates it will be important. While the sample sizes of individuals with low and high self-sacrificing prosociality were unbalanced in Studies 1 to 3, the findings could be useful in providing initial insights on individual differences and situations that motivate highly self-sacrificing individuals to harm outgroups over solely benefitting their ingroup. Based on the observations of these sample sizes which were applied to the serial mediational models in Studies 4 and 5, further findings consistently showed that highly self-sacrificing individuals were more inclined to harm outgroups than only boost the welfare of the ingroup. Additionally, using real group identities (rather than arbitrary minimal groups), concrete

stimuli, and immersive group situations such as rituals could plausibly motivate more individuals to exhibit self-sacrificial tendencies (Xygalatas et al., 2013).

The studies predominantly used online pools of participants who were based in the United States. However, studies comparing samples that were either recruited on-site in laboratory-based investigations or through online platforms have shown minor variations in patterns of responses (Bartneck et al., 2015), in economic game experiments (Raihani & Bell, 2017), and political ideologies (Clifford et al., 2015). The full moderated mediational models that predicted identity fusion to support for harsh policies toward the outgroups (identity fusion → self-sacrificing prosociality → anticipations of outgroup hostility → appraisals of outgroup aggression as actions of concern for the ingroup → support for outgroup harm policies) were not tested in studies to provide further evidence for the CSA framework under different severity levels of outgroup threat (i.e., absence to strong threat). However, the independent studies show the associations between these variables which provide preliminary support that may explain the full models.

9.3. Directions for future research

Addressing the need to understand the psychology of self-sacrifice (Bélanger et al., 2014), this research may serve as the first to extend previous theoretical investigations on how highly self-sacrificing members may possess distinctive cognitive trajectories, like being hypersensitive to ambiguous dangers and anticipative of intentional harm in intergroup contexts, which call for extreme self-sacrificial acts to harm outgroups over enhancing the well-being of kin-like ingroups.

Past intergroup interactions. The studies utilized in this thesis involved one-shot games (Studies 1 to 3) where individuals were not provided with opportunities to interact with the same outgroup and to observe plausible changes in their decisions and perceptions toward their ingroup and outgroups. In repeated-game versions of the IPD-MD game, Halevy et al. (2012) showed that, while contributions to ingroup benefit were greater than that of outgroup hate, individuals gradually made more selfish decisions. It would be of interest to investigate whether highly self-sacrificing individuals continue to display stable levels or increased aggression against outgroups that are repeatedly portrayed as not being a danger to the ingroup. Such information may potentially either reduce anticipated outgroup hostility or may signal as a cue of threat, which may affect decisions to self-sacrifice to harm the outgroup over helping the ingroup. Histories of intergroup rivalry could heighten anticipations of outgroup hostility and trigger perceptions of ingroup formidability (or vulnerability of the ingroup) to confront the outgroup. The perceived threat of vulnerability may amplify increased vigilance for threat-connotating cues and could be associated with self-sacrificial responses to aggress against outgroups. Furthermore, future studies may consider examining whether highly fused and self-sacrificing members may become reluctant to harm outgroups whom they helped before using minimal group paradigms and real group identities.

Specific group roles. Leaders and peripheral members like newcomers could exhibit higher levels of self-sacrificing prosociality than other members. During intergroup rivalry, leaders who are highly self-sacrificing for their group's welfare may prioritize group success and put the interests of their group members above their own needs and desires. Yet, leaders who are highly self-

sacrificing may use the group's successes as a strategy to retain their influence and power as defeats in intergroup competitions could threaten the position of a leader in the ingroup. Future research could additionally benefit from delving more deeply into the psychology of followership. Situational conditions like outgroup threat and leadership characteristics like effectiveness and legitimacy may increase members' willingness to follow their leaders in participating in self-sacrificial actions in intergroup competition. Peripheral group members might hold concerns of being similar to other ingroup members, and simultaneously would hold concerns over being potentially confused as a member of the outgroup. These concerns may result in the inference that peripheral ingroup members could be highly committed toward the maintenance of ingroup – outgroup distance and engagement in negativity toward outgroups. Future research might investigate how ingroup dynamics may vary in response to between-group, competitive situations, whether groups with a higher number of self-sacrificing leaders may become more prone to aggress against other groups, and whether such competitive groups could enjoy greater levels of welfare and effective ingroup interactions.

Influence of group norms. Members willingly give up their personal resources to discipline members who tend to be uncooperative, even without immediate and/or material benefits to the self or the group. However, why members may engage in individual costly punishment remains as a puzzle. Intergroup competition could boost the effectiveness of punishment in a group. When groups directly compete against one another, individuals from groups with opportunities for punishment could likely triumph over individuals from groups without opportunities for punishment. Future research may consider

whether individuals incur personal costs to harm outgroups may similarly incur personal costs to discipline their fellow members to ensure members share similar personality-based qualities in a group which might correspond to the principles of the identity fusion theory. Self-sacrificing prosociality could potentially be learned from ingroup rituals (learning to self-sacrifice through ritual practices may not involve expectations for ingroup members to similarly self-sacrifice). Euphoric as well as dysphoric ingroup rituals have been shown to increase greater levels of identity fusion and the willingness to self-sacrifice and fight against outgroups (Whitehouse et al., 2017). Conducting systematic manipulations of components within collective rituals may elucidate how such practices may relate to the mechanism of anticipated outgroup hostility and in turn, influence decisions to self-sacrifice for ingroup benefit over outgroup harm.

Moral emotions. Future research could examine the type and intensity of social emotions that may influence self-sacrificing prosociality, anticipations of outgroup hostility, and the prioritization of outgroup harm over ingroup benefit. Gómez et al. (2011) found that fused participants who felt ostracized by their groups were more willing to strongly support extreme pro-group behaviours such as using violent actions and were more likely to express less desire to exit the group, suggesting that fused individuals who are feel excluded from their group may develop strong self-sacrificing prosociality and engage in compensatory attempts like outgroup harm, to reaffirm their social identity and loyalty. This line of research could be used in proposing programs and interventions that may restrain specific types of messages that amplify feelings of threat to group identities such as appeals which may increase nationalistic

sentiments. Such messages, particularly when communicated and shared over mass and social media platforms, could elevate threat sensitivities and ingroup identification, as well as reinforce prejudicial and confrontational attitudes toward target outgroups within societies. Prospective studies may broaden the understanding of self-sacrificial prosociality through exploring the combinative effects of ingroup dynamics, emotions, and morality in (de)motivating outgroup aggression. Self-sacrificing prosociality in combination with threat-related, moral and emotional responses may generate cognitive appraisals that lead self-sacrificing members to interpret ambiguous cues as outgroup hostility and ultimately decide outgroup harm as a more effective strategy.

Cultural differences. The studies in this thesis did not extensively and experimentally examine the effect of culture on the relationship between self-sacrificing prosociality and outgroup harm. Differing from one another, cultural intergroup environments and climates may frame and accentuate diverse types of outgroup threats that evoke different intergroup emotions and responses (Cheon & Hong, 2016). Powerful narratives and worldviews like the clash of civilizations (Lewis, 1990; Huntington, 1996, as cited in Sidanius et al., 2015) and belief in evil (Webster & Saucier, 2015) may give prominence to conspiratorial explanations and supernatural ideas that are etched in cultural themes. Supporters of populist societies tend to perceive immigrant cultures as symbolic and realistic threats that create value-conflicts and disrupt status quos and livelihoods, which prompts them to prefer radical, right-wing politics and statutes (Charitopoulou & García-Manglano, 2018). Yustisia et al. (2020) found that religious fundamentalists who held strong perceptions of cultural tightness

were more likely to report high collective narcissism and willingness to fight and die.

In cultures that propagandize collective nostalgia, which is evoked by recollecting memories about the group's past triumphs and traumas, highly self-sacrificing members may buy into the alarmist sentiments that raise anticipated outgroup hostility and become ready to aggress against outgroups (Mols & Jetten, 2014). Analysing social media posts of followers of the Proud Boys organization supporting the early dominance of White culture, DeCook (2018) showed that majority of their hashtags connoted references to return to the collective past, brotherhood, willingness to fight, battle and war cry, as well as memes about 'AntiFa hunting permits' which promoted aggressive resistance. Besides paranoid thinking, cultures that uphold martyrdom ideals conduct rituals and ceremonies to deepen group loyalty and individual moral disengagement which may aid highly self-sacrificing members to overcome self-regulatory mechanisms that inhibit violence (Beller, 2017). Thus, diverse characteristics of cultural milieus may influence the relationship between self-sacrificing prosociality and outgroup aggression.

In sum, this thesis addressed a critical yet unaddressed knowledge gap about why ingroup members who are willing to self-sacrifice for the welfare of the ingroup may become motivated to willingly self-sacrifice to harm the outgroup without direct, clear benefits to the well-being of the ingroup. The findings demonstrated that highly self-sacrificing members may develop strong anticipations of outgroup hostility which could lead to the prioritization of aggression to strike pre-emptively against outgroups over enhancing the well-being of ingroup members, which may potentially initiate intergroup conflicts.

These results support the importance of self-sacrificing prosociality and anticipations of outgroup hostility in the emergence of human cooperation and intergroup conflict. How ingroup positivity and outgroup negativity may reciprocally reinforce and evolve, relative to one another, toward intractable and hostile intergroup conflict would entail future research.

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Appendix A: Survey questionnaire for Study 1

Q1.1 Informed Consent

Please read this consent agreement carefully. You must be 18 years old or older to participate.

Purpose of the research:

The aim of this study is to examine how individuals' perception and interpretation of social situations influence their decisions in social contexts.

What you will do in this study:

During this study you may be asked to:

- Complete social decision-making tasks in which you make choices that affect your own outcomes, as well as the outcomes of other participants. Decisions involve choices such as allocation of resources or responsibilities. Your decisions will affect outcomes such as points or credits earned in the decision-making task, which may be used to determine bonus payment that you and other participants can earn during the experiment.
- Perform a task or responsibility that may be assigned to you by one or more member/s of your group.
- You may be asked to view images, write about, manipulate, handle, and make decisions regarding different types of resources. This includes resources such as points that may be exchanged for rewards in decision-making tasks or money.
- You may be asked to view, categorize, and rate images of social scenes or faces of people that belong to different social or ethnic groups.
- Complete a series of surveys regarding your attitudes, opinions, and beliefs about yourself, your relationship with others, and social issues.

Risks:

There are no anticipated risks, beyond those encountered in daily life, associated with participating in this study.

Compensation and Benefits:

You will receive \$1.50 dollar per 45 minutes of participation in compensation for participating in this experiment. In some sections of the experiment, you may be able to earn a performance-based bonus payment. Upon completion, you will receive an explanation of the study and the hypotheses. We also hope that you will learn a little bit about how psychological research is conducted.

Voluntary Withdrawal:

Your participation in this study is completely voluntary, and you may

withdraw from the study at any time without penalty. You may skip over any questions or procedures that you do not wish to answer. Your decision to participate, decline, or withdraw participation will have no effect on your status.

Confidentiality:

Your participation in this study will remain confidential, and your identity will not be stored with your data. Your responses will be assigned a code number that is not linked to your name or other identifying information. All data and consent forms will be stored in a locked room. Results of this study may be presented at conferences and/or published in books, journals, and/or in the popular media.

Further information:

If you have any enquiries concerning the study in the future, please feel free to contact Dr. Bobby Cheon (bkcheon@ntu.edu.sg) at School of Humanities and Social Sciences, Nanyang Technological University.

Who to contact about your rights in this study:

If you have any enquiries concerning the study in the future, please feel free to contact Nanyang Technological University Institutional Review Board.
Email: irb@ntu.edu.sg / Phone: 65-65922495.

Agreement:

The purpose and nature of this research have been sufficiently explained and I agree to participate in this study. I understand that I am free to withdraw at any time without incurring any penalty.

- I AGREE to participate in this study (this will start the study)
- I DO NOT AGREE to participate in this study (please close the browser window)

Q1.2 Introduction to the study

Welcome to the Decision-Making Study! In this experiment, your decisions will be combined with decisions of 4 other random participants of this survey to represent a series of group decisions.

You will be making decisions involving ‘points’ that you can keep or use during each round of the experiment. The points you earn can be redeemed for bonus MTurk payment (in addition to your \$1.50 dollar payment just for participating) at a later time. Every 50 points you earn during this experiment will be exchanged for 10-cents in bonus payment. You can earn total bonus payment of up to 70-cents at the end of the experiment. Thus, the more points you earn during the experiment, the more bonus payment you will receive.

The total bonus amount will be paid to you at a later time after the data from this study has been collected and analyzed. Because your decisions during the experiment may influence the bonus payments of yourself and other participants, please pay attention and read the instructions for the experiment carefully.

Q2.1 Volunteer's dilemma game instructions

You will play this decision-making game with a group of 5 players comprised of participants (including yourself). The 4 other players in your group will be selected from the other participants who also complete this online study.



You will play MULTIPLE ROUNDS of this game. You will play each round in this game with the same 4 players in your group. You will not be able to interact with your group members and no feedback about their choices will be given.

Q2.2 Each player will begin every round with an individual pool of 10 points.



For every round, each player must choose to VOLUNTEER or KEEP points. If a player chooses to VOLUNTEER, he (or she) will lose the points volunteered. If a player chooses to KEEP, he (or she) will incur no cost of losing points.

In each round, the number of points for volunteering will vary.

Q2.3 For each round in this game:

If no one volunteers, all players will lose points. Each player in the group will lose the same number of points. The loss of points, if no one volunteers, will vary for every round. If at least one player in your group volunteers, the other 4 players who kept their points will not lose any points. Only the player who volunteered will lose points. The other 4 members who did not volunteer will retain their points. If more players volunteer, there will be no additional benefit for the group and for each player. The players who volunteered will lose their points. The other players who did not volunteer will not lose any points. You

will not interact and see other players' decisions while choosing yours, and vice versa.

Points that are volunteered will NOT be returned to players.

Q2.4 Description of example scenario

FOR EXAMPLE:

In this round:

The cost of volunteering is 2 points.

If no one volunteers, all players will lose 8 points. If a player volunteers, he (or she) will lose 2 points. If at least one player in your group volunteers 2 points, then the other 4 players who kept their points will not lose any points.

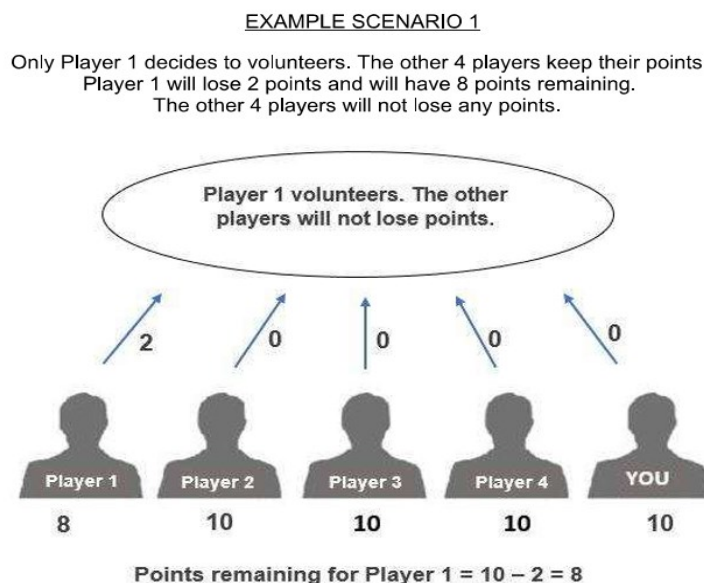
Do you choose to VOLUNTEER or KEEP your points?

EXAMPLE SCENARIO 1

Only Player 1 decides to volunteers. The other 4 players keep their points.

Player 1 will lose 2 points and will have 8 points remaining.

The other 4 players will not lose any points.



Q2.7 Game instructions reminder

Please keep in mind:

- You will always begin each round with an allotment of 10 points.
You will always be in a group of 5 players (including yourself) in each round. You will play each round with the same players in your group.

The other players in your group will be randomly assigned to your group from the other participants who complete this survey.

The amount of points volunteered in each round is NOT returned to the players.

- Points you accumulate across all the rounds will be totalled at the end of the game. Every 50 points will be converted to ten cents (\$0.10). In addition to the \$1.50 dollar you receive for completing this survey, you can earn bonus payment of up to \$0.70.
- You will receive payment at a later time (after data have been collected and analyzed) based on the number of points you accumulated. During each round, you will provide your decision by clicking on the given options. You will also be asked to answer some questions about your decision.

Click '>>' to answer a short quiz about the rules of the game

Q3.1 Understanding of VoD game instructions

Please answer the following questions regarding the instructions for the decision-making game.

Q3.2 The description of the group decision-making game's rules was difficult to understand.

- Strongly Disagree
- Disagree
- Slightly Disagree
- Slightly Agree
- Agree
- Strongly Agree

Q3.3 I clearly understand the rules of the group decision-making game.

- Strongly Disagree
- Disagree
- Slightly Disagree
- Slightly Agree
- Agree
- Strongly Agree

Q3.10 Quiz Question of Volunteer's dilemma game

Suppose at least one person volunteers and the others in your group do not. In a hypothetical round of the game, which of the following options is correct?

- a player who volunteered will lose points and the other players will not lose their points
- all players will lose points

- a player who volunteered will not lose points and the other players will lose 10 points
- a player who volunteered will gain points from other players

Q3.11 Correct response to the quiz question

CORRECT!

Quiz Question:

Suppose at least one person volunteers and the other 4 players in your group do not.

In a hypothetical round of the game, which of the following options is correct?

Only the player who volunteered will lose points.

The other 4 members will not lose any points.

Q3.12 Incorrect response to the quiz question

INCORRECT!

Quiz Question:

Suppose at least one person volunteers and the others in your group do not.

In a hypothetical round of the game, which of the following options is correct?

A rule of this game is that, if at least one player in your group volunteers, the other 4 players who did not volunteer will not lose any points.

A second rule of this game is that the player who volunteered will lose points and these points will not be returned.

In this hypothetical round, only one player volunteered and the 4 other players did not volunteer.

According to the first rule, the other 4 members who did not volunteer, will not lose any points, as there was one player from their group who volunteered.

Following the second rule of the game, only the player who volunteered will lose points.

These points will not be returned back to the player who volunteered.

Q4.1 Example of Volunteer's dilemma 10-10 game round

In this round:

The cost of volunteering is 10 points.

If no one volunteers, each player will lose 3 points. If you volunteer, you will lose 10 points. The other players who kept their points will keep their 10 points.

If at least one person in your group volunteers 10 points, the other players who kept their points will keep their 10 points. You will need to choose if you will VOLUNTEER or KEEP your points.

POOL A

Every 1 point invested to Pool A will give 2 points to your group (the point that was invested + additional 1 point). These two points (per each point you invest) will then be distributed evenly among the five members of your group, including yourself.

POOL B

Every 1 point invested to Pool B will give 1 point to your group. This one point will be deducted from the other group. This point (per each point you invest) will then be distributed evenly among the five members of your group, including yourself.

POOLS A and B for the other group

The other group will have its own Pool A and Pool B. Their Pools will follow the same set of rules. When a member of the other group invests 1 point in Pool A, 2 points will be given to his (or her) group. When a member of the other group invests 1 point in Pool B, 1 point will be deducted from your group and will be given to the other group.

BONUS REWARD

At the end of every round, the number of points each group earned and lost from investments in their Pools A and B will be calculated. The number of points your group has remaining in Pools A and B (after accounting for deductions from the other group's investments in Pool B) will be compared to the other group.

The group that obtains the greater sum of points through investments (after losses have been accounted for) will be given bonus reward points. These bonus reward points will be given to each player of the winning group (the group with more total points earned during the round). The number of bonus points will vary in each round.

At the end of each round, every player in the winning group will get an equal share of the points earned from their Pools A and B, and will receive the bonus reward points.

In all rounds, you will not be able to interact with other players. Members in the other group will receive this same set of instructions.

Q11.3 Example round of IPD-MD game

For Example:

You have 10 points that you can invest to Pool A, Pool B, or keep for yourself.

Investing 1 point in Pool A will give 2 points to your group, which will be

divided evenly among your group members.

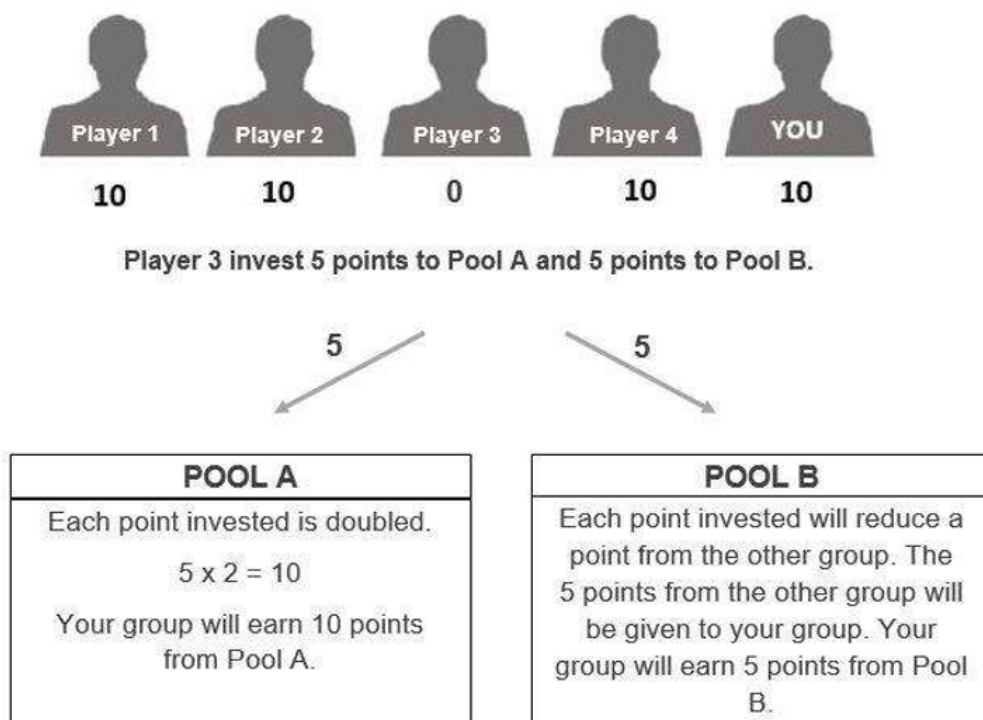
Investing 1 point in Pool B will give 1 point to your group, which will be divided evenly among your group members. This one point will be deducted from the other group.

The group with the MOST points in Pools A and B will receive a bonus reward of 40 points per player.

How much do you choose to invest to Pool A, Pool B, or keep for yourself?

EXAMPLE SCENARIO 1

Player 3 in your group decides to invest 5 points to Pool A and 5 points to Pool B.



Player 3 invest 5 points in Pool A, which costs him 5 points but gives 10 points to your group.

From these 10 points, every member of your group, including Player 3, receives 2 points.

Hence, the four other members of your group have won 2 points each and that cost Player 3 3 points net (he first invested 5 points and then got 2 points).

Player 3 invests the remaining 5 points in Pool B, which costs him 5 points

and gives 5 points to your group. These 5 points will be taken from the other group and given to your group. The other group will lose 5 points from their total sum of points at the end of the round.

From these 5 points, every member of your group, including Player 3, receives 1 point.

Hence, the four other members of your group have won 1 point each and that cost Player 3 a net of 4 points (he first invested 5 points and then got 1 point).

In this round, Player 3 gets 3 points (2 points from Pool A + 1 point from Pool B) from his own decisions, in addition to the amounts that would be distributed to the group based on the investment decisions of each of his 4 other group members.

Player 3 also earns his group 15 points in investments (10 points from Pool A and 5 points from Pool B) which will be added with other group members' investments. His group's total investment will be compared with the other group's total investment (after accounting for deductions from the other group's investments in Pool B) to determine which group won the bonus points for the round.

Q11.5 Game instructions reminder

Please keep in mind:

- You will always begin each round with an allotment of 10 points. You will always be in a group of 5 players (including yourself) in each round. In all rounds, you will play with the same members in your group. The 4 players in your group are the same players from the previous decision-making game.
- At the end of each round, the group with the MOST points in Pools A and B will win the bonus reward points. The bonus reward points will be given to every player in the winning group. The amount of points invested in each round is NOT returned to the players.
- Points you accumulate across all the rounds will be totalled at the end of the game. Every 50 points will be converted to ten cents (\$0.10). In addition to the \$1.50 dollar you receive for completing this survey, you can earn bonus payment of up to \$0.70. You will receive payment at a later time (after data have been collected and analyzed) based on the number of points you accumulated.
- During each round, you will provide your decision by clicking on the given options. You will also be asked to answer some questions about your decision.

Click '>>' to answer a short quiz about the rules of the game.

Q12.1 Understanding of IPD-MD game

Please answer the following questions regarding the instructions for the decision-making game.

Q12.2 The description of the group decision-making game's rules was difficult to understand.

- Strongly Disagree
- Disagree
- Slightly Disagree
- Slightly Agree
- Agree
- Strongly Agree

Q12.3 I clearly understand the rules of the group decision-making game.

- Strongly Disagree
- Disagree
- Slightly Disagree
- Slightly Agree
- Agree
- Strongly Agree

Q12.4 Example of quiz question in the IPD-MD game

Quiz Question:

Suppose your group has a higher sum of points from investments than the other group at the end of a round. In a hypothetical round of the game, which of the following options is correct?

- Each player in your group will receive the bonus reward.
- Your group will lose the bonus reward.
- The bonus reward points will be taken from the other group and will be given to your group.
- The bonus reward will be given only to players who invested their points.

Q12.5 Correct response to quiz question

CORRECT!

Quiz Question:

Suppose your group has a higher sum of points than the other group at the end of a round. In a hypothetical round of the game, which of the following options is correct?

Each player in your group will win the bonus reward. A rule of this game is that the group with the larger sum of points wins the bonus reward. Each member will receive the same amount of the bonus points.

Q12.6 Incorrect response to quiz question

INCORRECT!

Quiz Question:

Suppose your group has a higher sum of points than the other group at the end of a round. In a hypothetical round of the game, which of the following options is correct?

A rule of this game is that, the group with the larger sum of points at the end of a round, will win the bonus reward. Your group will win the bonus reward and each member will receive the same number of bonus reward points. The other group will NOT get the bonus reward as their total sum of points is lower than your group. The bonus reward will NOT be taken from the other group.

Q13.1 Example round of the IPD-MD game involving 70-point bonus reward

In this round:

You have 10 points that you can invest to Pool A, Pool B, or keep for yourself.

Investing 1 point in Pool A will give 2 points to your group.

Investing 1 point in Pool B will give 1 point to your group.

This 1 point will be deducted from the other group.

At the end of this round, the number of points your group has remaining in Pools A and B will be compared to the other group.

The group that obtains the MOST points in both Pools will win a bonus reward of 70 points per player. Each player in the winning group will equally share the points earned from their Pools A and B, and will receive 70 bonus points.

How many points would you INVEST?

	0	1	2	3	4	5	6	7	8	9	10	
Points to invest to Pool A												0
Points to invest to Pool B												0
Keep for myself												0
Total:												0

Q13.2 Expectation items after each round

Please answer the following questions regarding your decision in this round:

1. How many points do you think members in your group invested in Pool A?
2. How many points do you think members in your group invested in Pool B?
3. How many points do you think members in the other group invested in Pool A?
4. How many points do you think members of the other group invested in Pool B?

Q19.1 Expectation items of self, ingroup, and outgroup items

Please answer the following questions regarding your decisions in the rounds that involved the other group:

1. When making my decisions, I aimed to obtain good outcomes for myself.
2. When making my decisions, I tried to maximize my personal gain.
3. When making my decisions, I assumed other members in my group will invest their points.
4. When making my decisions, I wanted to reduce points of the other group.
5. When making my decisions, I wanted to reduce points of the other group.
6. When making my decisions, I wanted to make sure my group will get more points than the other group.
7. When making my decisions, I tried to win the bonus reward from the other group.
8. I expected members of the other group will aim to reduce points for my group.
9. I expected members of the other group will try to win the bonus reward from my group.
10. I expected members of the other group will aim to maximize their points.

Q20.1 Competitive jungle scale

Please read each of the items carefully, and provide the response that best represents your feelings or the way that you would behave.

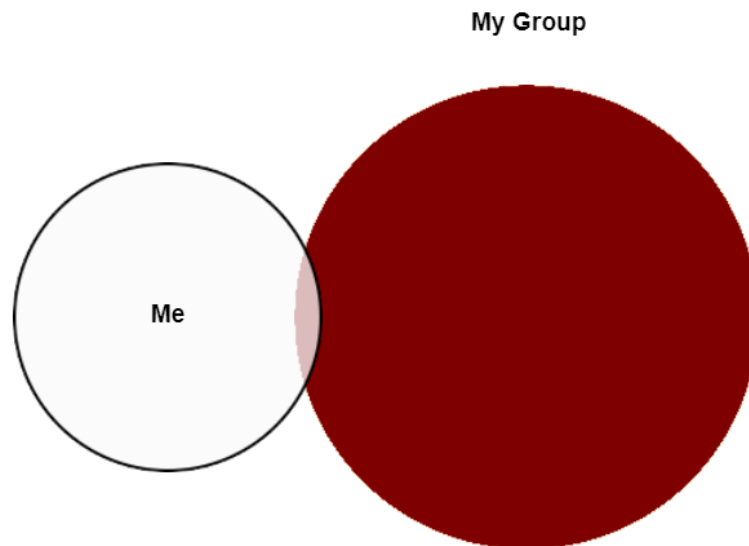
1. The best way to lead a group under one's supervision is to show them kindness, consideration, and treat them as fellow workers, not as inferiors.
2. If it's necessary to be cold-blooded and vengeful to reach one's goals, then one should do it.

3. Life is not governed by “the survival of the fittest”. We should let compassion and moral laws be our guide.
4. Winning is not the first thing; it’s the only thing.
5. Money, wealth, and luxury are what really count in life.
6. It’s a dog-eat-dog world where you have to be ruthless at times.
7. It is much more important in life to have integrity in your dealings with others than to have money and power.
8. Charity (i.e., giving somebody something for nothing) is admirable, not stupid.
9. You know that most people are out to “screw” you, so you have to get them first when you have the chance.
10. My knowledge and experience tells me that the social world we live in is basically a competitive “jungle” in which the fittest survive and succeed; power, wealth, and winning are everything, and might is right.
11. One should give others the benefit of the doubt. Most people are trustworthy if you have faith in them.
12. We can make a society based on unselfish cooperation, sharing, and people generously helping each other, and not on competition and acquisitiveness.
13. If you have power in a situation, you should use it however you have to get your way.
14. It is better to be loved than to be feared.

Q21.1 Identity fusion measure (Dynamic Identity Fusion Index)

The diagram below is designed to represent how you see your relationship with your group ("My Group"). Please indicate your response by clicking and dragging the smaller "Me" circle to the position that best captures your relationship with this group. (*You may ignore the numbers.*)

Distance (1) _____
Overlap (2) _____



Q22.1 Need for cognitive closure scale

Please read each of the items carefully, and provide the response that best represents your feelings or the way that you would be behave.

1. I don't like situations that are uncertain.
2. I dislike questions which could be answered in many different ways.
3. I find that a well ordered life with regular hours suits my temperament.
4. I feel uncomfortable when I don't understand the reason why an event occurred in my life.
5. I feel irritated when one person disagrees with what everyone else in a group believes.
6. I don't like to go into a situation without knowing what I can expect from it.
7. When I have made a decision, I feel relieved.
8. When I am confronted with a problem, I'm dying to reach a solution very quickly.
9. I would quickly become impatient and irritated if I would not find a solution to a problem immediately.
10. I don't like to be with people who are capable of unexpected actions.
11. I dislike it when a person's statement could mean many different things.
12. I find that establishing a consistent routine enables me to enjoy life more.
13. I enjoy having a clear and structured mode of life.
14. I do not usually consult many different opinions before forming my own view.
15. I dislike unpredictable situations.

Q23.1 Readiness to self-sacrifice scale

Please read each of the items carefully, and provide the response that best represents your feelings or the way that you would be behave.

1. It is senseless to sacrifice one's life for a cause.
2. I would defend a cause to which I am truly committed even if my loved ones rejected me.
3. I would be prepared to endure intense suffering if it meant defending an important cause.
4. I would not risk my life for a highly important cause.
5. There is limit to what one can sacrifice for an important cause.
6. My life is more important than any cause.
7. I would be ready to give my life for a cause that is extremely dear to me.
8. I would be willing to give away all my belongings to support an important cause.
9. I would not be ready to give my life away for an important cause.
10. I would be ready to give up all my personal wealth for a highly important cause.

Q25.1 Debriefing statement

Thank you for participating in our experiment.

This study seeks to better understand how people behave and make decisions in social contexts. Specifically, we are interested in how different demands and pressures on groups may affect cooperation and competition in groups. We request that you do not share this information with others, since prior knowledge about this aspect of our experiment may adversely affect future participants. If you choose to withdraw your data from the study based on the information provided on this debriefing, you may do so.

You will still receive your compensation for participating in the study even if you choose to withdraw your data. You will receive your bonus payment amounts at a later time as an MTurk worker bonus after the completion of the entire study and bonus amounts have been computed based on group decisions. In addition, please feel free to contact Dr. Bobby Cheon (bkcheon@ntu.edu.sg) or Shalini Katna (h160007@ntu.edu.sg) if you have any questions or concerns about the study. Once again, we thank you for your participation in this experiment.

If you have any questions or comments about the study or any other comments, please enter them below. Also, please let us know about any instructions or rules of the decision-making game that were unclear or difficult to understand. (if you have no comments, please go to the next page to receive your completion code)

Appendix B: Survey questionnaire for Study 2

Q1.1 Informed Consent

Please read this consent agreement carefully. You must be 18 years old or older to participate.

Purpose of the research:

The aim of this study is to examine how individuals' perception and interpretation of social situations influence their decisions in social contexts.

What you will do in this study:

During this study you may be asked to:

- Complete social decision-making tasks in which you make choices that affect your own outcomes, as well as the outcomes of other participants. Decisions involve choices such as allocation of resources or responsibilities. Your decisions will affect outcomes such as points or credits earned in the decision-making task, which may be used to determine bonus payment that you and other participants can earn during the experiment.
- Perform a task or responsibility that may be assigned to you by one or more member/s of your group.
- You may be asked to view images, write about, manipulate, handle, and make decisions regarding different types of resources. This includes resources such as points that may be exchanged for rewards in decision-making tasks or money.
- You may be asked to view, categorize, and rate images of social scenes or faces of people that belong to different social or ethnic groups.
- Complete a series of surveys regarding your attitudes, opinions, and beliefs about yourself, your relationship with others, and social issues.

Risks:

There are no anticipated risks, beyond those encountered in daily life, associated with participating in this study.

Compensation and Benefits:

You will receive \$1.50 dollar per 45 minutes of participation in compensation for participating in this experiment. In some sections of the experiment, you may be able to earn a performance-based bonus payment. Upon completion, you will receive an explanation of the study and the hypotheses. We also hope that you will learn a little bit about how psychological research is conducted.

Voluntary Withdrawal:

Your participation in this study is completely voluntary, and you may withdraw

from the study at any time without penalty. You may skip over any questions or procedures that you do not wish to answer. Your decision to participate, decline, or withdraw participation will have no effect on your status.

Confidentiality:

Your participation in this study will remain confidential, and your identity will not be stored with your data. Your responses will be assigned a code number that is not linked to your name or other identifying information. All data and consent forms will be stored in a locked room. Results of this study may be presented at conferences and/or published in books, journals, and/or in the popular media.

Further information:

If you have any enquiries concerning the study in the future, please feel free to contact Dr. Bobby Cheon (bkcheon@ntu.edu.sg) at School of Humanities and Social Sciences, Nanyang Technological University.

Who to contact about your rights in this study:

If you have any enquiries concerning the study in the future, please feel free to contact Nanyang Technological University Institutional Review Board. Email: irb@ntu.edu.sg / Phone: 65-65922495.

Agreement:

The purpose and nature of this research have been sufficiently explained and I agree to participate in this study. I understand that I am free to withdraw at any time without incurring any penalty.

- I AGREE to participate in this study (this will start the study)
- I DO NOT AGREE to participate in this study (please close the browser window)

Q1.2 Introduction to the Study

Welcome to the Decision-Making Study!

In this experiment, your decisions will be combined with decisions of 4 other random participants of this survey to represent a series of group decisions. You will be making decisions involving ‘points’ that you can keep or use during each round of the experiment.

The points you earn can be redeemed for MTurk payment (in addition to your \$1.50 dollar payment just for participating) at a later time. Every 20 points you earn during this experiment will be exchanged for 10-cents in additional payment. You can earn total additional payment of up to 60-cents at the end of the experiment. Thus, the more points you earn during the experiment, the more additional payment you will receive. This amount will be paid to you at a later time after the data from this study has been collected and analyzed. Because your

decisions during the experiment may influence the bonus payments of yourself and other participants, please pay attention and read the instructions for the experiment carefully.

Q2.1 Instructions for Volunteer's dilemma game

You will play this decision-making game with a group of 5 players comprised of participants (including yourself). The 4 other players in your group will be selected from the other participants who also complete this online study.



You will play MULTIPLE ROUNDS of this game. You will play each round in this game with the same 4 players in your group.

You will not be able to interact with your group members and no feedback about their choices will be given.

Q2.2 Each player will begin every round with an individual pool of 10 points.



For every round, each player must choose to VOLUNTEER or KEEP points. If a player chooses to VOLUNTEER, he (or she) will lose the points volunteered. If a player chooses to KEEP, he (or she) will incur no cost of losing points. In each round, the number of points for volunteering will vary.

Q2.3 For each round in this game:

If no one volunteers, all players will lose points. Each player in the group will lose the same number of points. The loss of points, if no one volunteers, will vary for every round. If at least one player in your group volunteers, the other 4 players who kept their points will not lose any points. Only the player who volunteered will lose points. The other 4 members who did not volunteer will retain their points. If more players volunteer, there will be no additional benefit for the group and for each player. The players who volunteered will lose their points. The other players who did not volunteer will not lose any points. You will not interact and see other players' decisions while choosing yours, and vice versa. Points that are volunteered will NOT be returned to players.

Q4.1 In this round: The cost of volunteering is 3 points. If no one volunteers, each player will lose 3 points. If you volunteer, you will lose 3 points. The other players who kept their points will not lose any points. If at least one player in your group volunteers 3 points, the other players who kept their points will not lose any points. You will need to choose if you will VOLUNTEER or KEEP your points.

Do you choose to:

- VOLUNTEER (You will lose 3 points even if another player volunteers)
- KEEP (You will not lose any points if another player volunteers)

Q4.2 In this round:

1. How likely do you think other members will volunteer?
2. When making my decision, I aimed to help my group members.

Q4.3 In this round:

1. When making my decision to keep, I assumed other players will volunteer their points.
2. When making my decision, I aimed to maximize points I earned for myself.

Q13.1 Instructions for IPD-MD+C game

You and your 4 group members will play a new decision-making game with other groups. This game comprises of 3 rounds. In each round, your group will be randomly matched to play with a new group of 5 players.

The 4 members in your group are the same players from the previous decision-making game. In all rounds, you will play with the same members in your group. The other group will consist of 5 participants who have already completed this survey and provided their decisions.



In this game, each player in the two groups will start with 10 points.

You will not be able to interact with other players and no feedback about their choices will be given.

Every player will be asked to INVEST or KEEP his (or her) points.

There are 3 Pools - A, B, C - where you may invest any number of your 10

points. You may choose to invest your points in all or any Pool(s), or keep the points for yourself.

Investing 1 point in Pool A will give your group 2 points which will be divided equally among members in your group.

Investing 1 point in Pool B will give your group 1 point which will be divided equally among members in your group. This 1 point will be deducted from the other group.

Investing 1 point in Pool C will deduct 2 points from the other group. These 2 points will NOT be distributed to your group.

Q13.2 In every round, the other group may cause a loss of points to some or all members in your group through making contributions in their group's Pools B and C. Similarly, you and your group members will be able to cause all members in the other group to lose points by investing in your group's Pools B and C. Hence, the decisions that players in the other group and members in your group take, will affect outcomes (such as the loss of points) for their group as well as your group.

At the end of each round, contributions that the other group made to their Pools B and C will be summed and deducted from your group's Pools A and B. The balance points, if any remaining, in your group's Pools A and B will be equally distributed among the 5 players in your group. Thus,

$$\begin{aligned} & [(Your\ group's\ Pools\ A\ and\ B) - (The\ other\ group's\ Pools\ B\ and\ C)] / 5 \\ & = (Remaining\ points\ in\ your\ group's\ Pools\ A\ and\ B) / 5 \\ & = Equal\ share\ of\ points\ for\ each\ member\ in\ your\ group \end{aligned}$$

If the sum of your group's Pools A and B is lesser than the sum of the other group's Pools B and C, the difference in points will be equally deducted from members in your group.

All players in the other groups will be given the same set of instructions. For each round, once all players in the other group have made their decisions to contribute, they will not be allowed to change the allocations of their points. Before making your decisions, you and your group members will be shown how each player in the other group have already decided to contribute his (or her) points to the three Pools.

An example scenario is shown on the next page.

Q13.3 Example round of IPD-MD+C game

EXAMPLE SCENARIO

In this round, the other group has unanimously decided to invest 20 points to their Pools B and C, to cause a loss to all players in your group.

The pool contributions of the other group are as follows:

	Player 1	Player 2	Player 3	Player 4	Player 5	Total Contributions (by Pool)
Contribution to Pool A	0	2	3	3	1	9
Contribution to Pool B	3	0	2	3	0	10
Contribution to Pool C	3	2	2	2	1	10

Based on the other group's contributions to Pools B and C, your group will lose:

10 points (from Pool B) + (10 points x 2) (from Pool C) = 30 points

You have 10 points that you can invest to Pool A, Pool B, Pool C, or keep for yourself.

Investing 1 point in Pool A will give your group 2 points which will be divided equally among members in your group.

Investing 1 point in Pool B will give your group 1 point which will be divided equally among members in your group. This 1 point will be deducted from the other group.

Investing 1 point in Pool C will deduct 2 points from the other group. These 2 points will not be distributed to your group.

How many points would you INVEST to the 3 Pools in your group?

Q13.4 EXAMPLE SCENARIO (continued)

From your 10 points, you decided to invest:

2 points to Pool A, 2 points to Pool B, 2 points to Pool C, and keep 4 points for yourself.

Players 1 and 3, individually invest 3 points to Pool B.

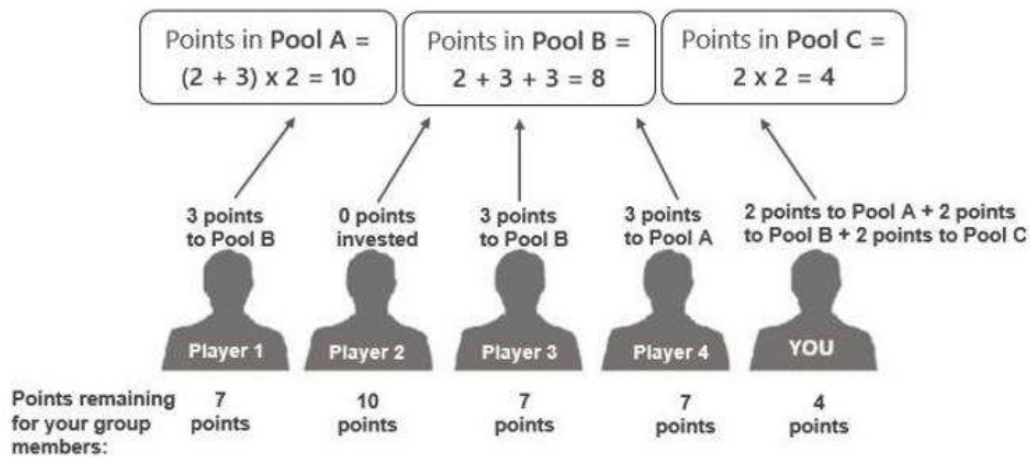
Player 4 invests 3 points in Pool A. Player 2 did not invest any points.

The total investments made by you and your members, to each Pool, are as follows:

Your group's Pool A: [2 (your contribution) + 3 (contributions from Player 4)] x 2 = 10

Your group's Pool B: 2 (your contribution) + 6 (contributions from Players 1 and 3) = 8

Your group's Pool C: $2 \text{ (your contribution)} \times 2 = 4$



Based on your group's Pools B and C, the other group will lose: $8 + 4 = 12$ points

The contributions from the other group's Pools B and C caused your group to lose 30 points. The total points in your group's Pools A and B are: $10 + 8 = 18$ points

At the end of this round, the other group's Pools B and C contributions are greater than the total contributions in your group's Pools A and B.

The sum of your group's Pools A and B is lesser than the sum of the other group's Pools B and C:

$30 \text{ points (from the other group)} - 18 \text{ points (your group)} = 12 \text{ points}$

This difference of 12 points will be equally deducted from each member in your group: $12 / 5 = 2.4$ points.

Therefore in this round, the points each member in your group will receive are:

- Player 1 = $7 - 2.4 = 4.6$ points
- Player 2 = $10 - 2.4 = 7.6$ points
- Player 3 = $7 - 2.4 = 4.6$ points
- Player 4 = $7 - 2.4 = 4.6$ points
- You = $4 - 2.4 = 1.6$ points

Q13.5 Game instructions reminder

Please keep in mind:

You will always begin each round with an allotment of 10 points.

You will always be in a group of 5 players (including yourself) in each round. In all rounds, you will play with the same members in your group. The

4 players in your group are the same players from the previous decision-making game.

In each round, your group will play with a NEW 5-member group who has already made their decisions. You will be able to see the final decisions and contributions of each player in the other group.

The amount of points invested in each round is NOT returned to the players.

Points you accumulate across all the rounds will be totalled at the end of the game. Every 20 points will be converted to ten cents (\$0.10). In addition to the \$1.50 dollar you receive for completing this survey, you can earn additional payment of up to \$0.60. You will receive payment at a later time (after data have been collected and analyzed) based on the number of points you accumulated.

During each round, you will provide your decision by clicking on the given options. You will also be asked to answer some questions about your decision.

Click '>>' to answer a short quiz about the rules of the game.

Q15.1 Example IPD-MD+C round (Self+Ingroup condition)

You and your group will be playing this round with another group of 5 players. The other group has decided not to invest any points, to cause a loss to ALL 5 players in your group. The point contribution of each member in the other group are as follows:

	Player 1	Player 2	Player 3	Player 4	Player 5	Total Contributions (by Pool)
Contribution to Pool A	4	5	7	4	5	25
Contribution to Pool B	0	0	0	0	0	0
Contribution to Pool C	0	0	0	0	0	0

Based on the other group's contributions to Pools B and C, your group will lose:

0 (from Pool B) + (0 x 2) (from Pool C) = 0 points

You have 10 points that you can invest to Pool A, Pool B, Pool C or keep for yourself.

Investing 1 point in Pool A will give your group 2 points which will be divided equally among members in your group.

Investing 1 point in Pool B will give your group 1 point which will be divided equally among members in your group. This 1 point will be deducted from the other group.

Q20.1 Example IPD-MD+C round (Ingroup only condition)

In this round, you and your group members will be playing with another group of 5 players.

You have been selected, by a randomizing script, as the only member from your group to be exempted from losing points during this decision-making game.

The 4 other members in your group will lose their points, if members in the other group contribute to their Pools B and C in this round.

The other group unanimously decided to invest 8 points to cause a loss to the other 4 players in your group.

The pool contributions of the other group are as follows:

	Player 1	Player 2	Player 3	Player 4	Player 5	Total Contributions (by Pool)
Contribution to Pool A	2	3	3	5	1	14
Contribution to Pool B	0	1	2	1	1	4
Contribution to Pool C	0	0	0	1	2	4

Based on the other group's contributions to Pools B and C, your group will lose: 4 points (from Pool B) + (4 points x 2) (from Pool C) = 12 points

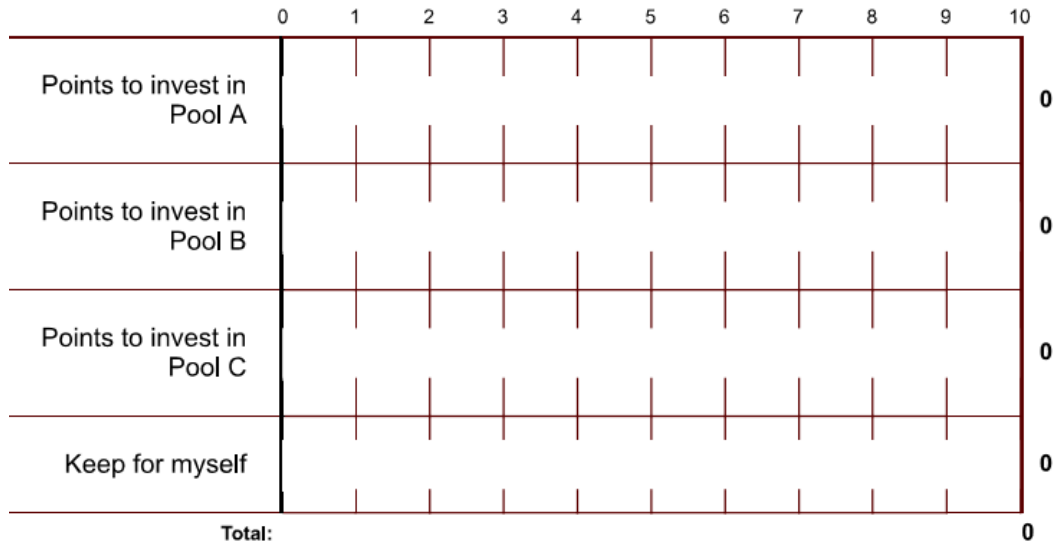
You have 10 points that you can invest to Pool A, Pool B, Pool C, or keep for yourself.

Investing 1 point in Pool A will give your group 2 points which will be divided equally among members in your group.

Investing 1 point in Pool B will give your group 1 point which will be divided equally among members in your group. This 1 point will be deducted from the other group.

Investing 1 point in Pool C will deduct 2 points from the other group. These 2 points will not be distributed to your group.

How many points would you INVEST to the 3 Pools in your group?



Q19.2 Please answer the following questions regarding your decision in this round:

1. How many points do you think your group members invested to Pool A?
2. How many points do you think your group members invested to Pool B?
3. How many points do you think your group members invested to Pool C?
4. How hostile do you think the other group is?
5. How competitive do you think the other group is?
6. My contributions were aimed at reducing the points of the other group.
7. My contributions were aimed at increasing the points for my group.

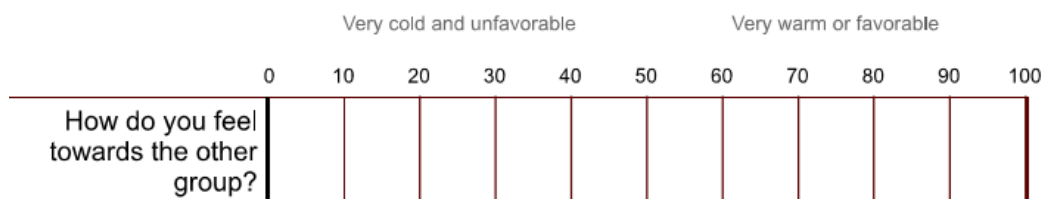
Q19.3 Feeling thermometer scale

How do you feel towards the other group?

Using the thermometer scale, please provide a number from 0 to 100 where 0 represents very cold or unfavorable feeling and 100 represents very warm or favorable feeling.

If you didn't feel particularly warm or cold toward a group, you could rate it at the 50-degree mark.

You may click and drag on the bar to indicate your response.



Q21.1 Expectation items of self, ingroup and outgroup

Please answer the following questions regarding your decisions in the rounds that involved the other groups:

1. When making my decisions, I aimed to obtain good outcomes for myself.
2. When making my decisions, I tried to maximize my personal gain.
3. When making my decisions, I assumed other members in my group will invest their points.
4. I expected members of my own group to try to maximize their personal gain.
5. I expected members of my own group to try to reduce the points of the other groups.
6. I expected members of my own group to try to increase the points of other group members.
7. The other groups tried to maximize their personal gain.
8. The other groups tried to increase the points of their fellow group members.
9. The other groups tried to reduce the points of my group.

Q21.2 This concludes the decision-making game. The total points you have earned on the games will be calculated at the end of the survey to provide you with your bonus payment. You will now be asked to complete a series of surveys regarding your preferences and opinions. There are no wrong or right answers to these surveys.

Q22.1 Group affiliation

Please list a group or organization that you strongly support and would closely affiliate with.

Q23.1 Readiness to self-sacrifice scale

Please read each of the items carefully, and provide the response that best represents your feelings or the way that you would behave in regards to the group you mentioned above.

1. It is senseless to sacrifice for a group cause.
2. I would defend my group and its causes to which I am truly committed, even if my loved ones rejected me.
3. I would be prepared to endure intense suffering if it meant defending important causes for my group.
4. I would not risk my life for a highly important group cause.
5. There is a limit to what one can sacrifice for a group.

6. My life is more important than any cause or group.
7. I would be willing to give away all my belongings to support my group's causes.
8. I would not be ready to give my life away for my group.
9. I would be ready to give up all my personal possessions for my group.
10. I would be ready to give my life for a cause that is extremely dear to me.

Q24.1 Identity fusion (Dynamic Identity fusion index)

The diagram below is designed to represent how you see your relationship with your group ("My Group"). Please indicate your response by clicking and dragging the smaller "Me" circle to the position that best captures your relationship with this group. (*You may ignore the numbers.*)

Distance _____

Overlap _____

Q25.1 Vengeance scale

Please read each item and decide whether you agree or disagree and to what extent.

1. It is important for me to get back at people who have hurt me.
2. I try to even the score with anyone who hurts me.
3. I live by the motto 'let bygones be bygones'.
4. There is nothing wrong in getting back at someone who has hurt you.
5. I believe in the motto 'an eye for an eye; a tooth for a tooth'.
6. I find it easy to forgive those who hurt me.
7. If someone causes me trouble, I'll find a way to make them regret it.
8. If I'm wronged, I can't live with myself unless I get revenge.
9. Revenge is sweet.
10. Honour requires that you get back at someone who has hurt you.
11. Anyone who provokes me deserves the punishment that I give them.
12. People who insist on getting revenge are disgusting.
13. It's not worth my time or effort to pay back someone who has wronged me.
14. It is always better not to seek vengeance.
15. I don't just get mad, I get even.
16. I am not a vengeful person.
17. Revenge is morally wrong.
18. To have a desire for vengeance would make me feel ashamed.
19. It is usually better to show mercy than to take revenge.
20. It is always better to "turn the other cheek."

Q26.1 Retributive justice scale

Please read each of the items carefully, and provide the response that best represents your feelings or the way that you would behave.

1. We should punish to get even with offenders.
2. The severity of the punishment should be proportional to the harm done.
3. Society has the right to take revenge on offenders.
4. Justice is restored when an offender pays back for the loss he (or she) has caused.
5. People who break the law should get harsher sentences.
6. When deciding on the appropriate punishment, offenders do not deserve to be treated according to fair rules and procedures.

Q28.1 Debriefing statement

Thank you for participating in our experiment. This study seeks to better understand how people behave and make decisions in social contexts. Specifically, we are interested in how different demands and pressures on groups may affect cooperation and competition in groups.

We request that you do not share this information with others, since prior knowledge about this aspect of our experiment may adversely affect from future participants. If you choose to withdraw your data from the study based on the information provided on this debriefing, you may do so.

You will still receive your compensation for participating in the study even if you choose to withdraw your data. You will receive your payment amounts at a later time as an MTurk worker bonus after the completion of the entire study and amounts have been computed based on group decisions.

In addition, please feel free to contact Dr. Bobby Cheon (bkcheon@ntu.edu.sg) if you have any questions or concerns about the study. Once again, we thank you for your participation in this experiment.

If you have any questions or comments about the study or any other comments, please enter them below. Also, please let us know about any instructions or rules of the decision-making game that were unclear or difficult to understand. (if you have no comments, please go to the next page to receive your completion code)

Appendix C: Survey questionnaire for Study 3

Q1 Player identification number (Deception item)

Please provide your alphanumeric ID.



Please wait as the host servers log you in.

This process may take a while.

You will be automatically directed to proceed.

Q1.1 Introduction to the study

Welcome to the Decision-Making Study!

In this experiment, your decisions will be combined with decisions of 4 other participants of this survey to represent a series of group decisions. You will be making decisions involving 'seconds' that you may allot during each round of the experiment.

The seconds that you allocate will determine the duration of a noise, which you will be required to hear at the end of this study.

Because your decisions during the experiment may influence outcomes for yourself and other participants, please pay attention and read the instructions for the experiment carefully.

Q1.12 Randomized group assignment (Deception item)

Please wait as the host servers verify the groups.

This may take a moment.

VALIDATION IN PROGRESS...



Please click '>>' once it appears to proceed.

Q1.13 Randomized group assignment (Deception item)

**You are assigned to
GROUP 2.**

VALIDATION COMPLETED

You will be automatically directed to proceed.

Q2.1 Introduction to Volunteer's dilemma game

In this decision-making game, you will play within a group of 5 players comprised of participants (including yourself). The 4 other members in your group will be selected from the other participants who also are currently participating in this study.



You will play MULTIPLE ROUNDS of this game. You will play each round in this game with the same 4 players in your group.

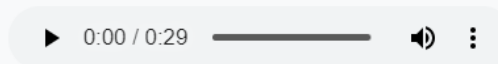
You will not be able to interact with your group members and no feedback about their choices will be given.

Q2.2 Sample and rating of aversive noise

For every round in this game, you and each of your 4 group members would be required to hear the noise for a specified duration. The following audio file is a 30 -second sample of the noise that you and your group members would be required to hear at the end of this session.

Please wear your headphones BEFORE playing the noise.

You may click on the play icon ► to start the noise and the pause icon || to stop the noise.



You may click on the play icon to start the noise and the pause icon to stop the noise.

Please rate your feelings towards the noise.

1. The noise was painful.
2. The noise was annoying.
3. The noise was pleasant.
4. The noise was tolerable.
5. The noise was uncomfortable.

Q2.3 Instructions for Volunteer's dilemma game

Each member will begin with 0 seconds.



In every round, each member in your group must choose to VOLUNTEER or REFRAIN. If a member chooses to VOLUNTEER, only he (or she) will need to hear a noise for a specific time duration. If a member chooses to REFRAIN, he (or she) will not need to hear a noise for a specific time duration.

Q2.4 In each round:

If at least one member in your group volunteers to hear the noise, the other 4 members will not need to hear the noise. Only the member who volunteered will have to hear the noise for a specific duration. The other 4 members would not be required to hear the noise.

BUT, if NO ONE volunteers, all 5 members in your group, including yourself, will hear the noise for a specified duration.

If more than one member volunteers, there will be no additional benefit for the group and for each individual. Only members who volunteered will hear the noise while the other members who did not volunteer will not hear the noise. Even with multiple volunteers, every member who volunteered will have to hear the noise.

You will not interact and see other members' decisions while choosing yours, and vice versa.

After making your decision in each round:

The noise duration that you might be required to hear, will be summed together with noise durations you may acquire from subsequent rounds.

At the end of this experiment:

You will be informed of your total noise duration that was summed from all rounds during this game. You will be required to hear the noise for that totalled duration at the end of this experiment.

Q2.5 Example round in the Volunteer's dilemma game

You will be shown an EXAMPLE ROUND and SCENARIO in this game.

=====

This is an EXAMPLE ROUND in this game.

In this round, the duration of noise to hear is 4 seconds.

If a member volunteers, only he (or she) will hear the noise for 4 seconds.

If at least one member in your group volunteers to hear the noise for 4 seconds, then the other members who did not volunteer will not be required to hear the noise.

BUT, if NO ONE volunteers, all members will be required to hear the noise for 8 seconds.

Do you choose to VOLUNTEER or REFRAIN?

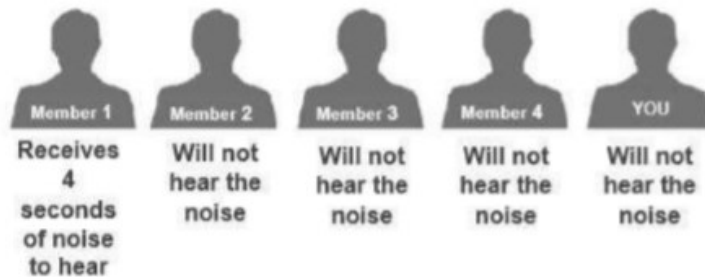
This is an EXAMPLE SCENARIO in this game.

Suppose that, only Member 1 decides to volunteer
and the other 4 members do not volunteer.

Only Member 1 will hear the noise for 4 seconds at the end of this experiment.
The other 4 players will not hear the noise.

Only Member 1 decides to volunteer.
The other 4 members do not volunteer.

Only Member 1 will hear the noise for 4 seconds. Members 2, 3, 4 and you will not hear the noise.



However, if there was more than one member who volunteered in addition to Member 1, the members who volunteered would each have to hear the noise for 4 seconds at the end of this experiment. The other members who did not volunteer will not hear the noise.

If NO ONE volunteered, each member in your group including yourself, will hear the noise for 8 seconds at the end of this experiment.

Q2.6 Please keep in mind:

- You will always begin each round with 0 seconds. You will always be in a group of 5 players (including yourself) in each round. You will play each round with the same members in your group. The other members in your group will be randomly assigned to your group from the other participants who complete this study.
- In each round, you must choose to either volunteer or refrain from hearing a noise for a specified duration. Only the member who volunteered will have to hear the noise for a specific duration. The other member(s) who did not volunteer would not be required to hear the noise.
- BUT, if NO ONE volunteered, all 5 members in your group including yourself, will have to hear the noise for a specified duration. If more than one member volunteers, there will be NO additional benefit for the group and for each individual. Even with more than one volunteer, every member who volunteered will have to hear the noise. The noise duration that you may acquire in a round, will be summed together with noise durations you may acquire in subsequent rounds.

- At the end of this experiment, you will be informed of your total noise duration that was summed from all rounds in this game, and will be required to hear the noise for that total duration.

Please click '>>>' to answer a short quiz about the rules of this game.

Q3 Quiz Question:

Suppose at least one member volunteers and the others in your group do not. In a hypothetical round of the game, which of the following options is correct?

1. a member who volunteered will hear the noise for a specific duration and the other members will not hear the noise
2. all members will hear the noise for 15 seconds
3. a member who volunteered will not hear the noise and the other 4 members will hear the noise for a specific duration
4. all members will not hear the noise

Q3.1 Correct response for quiz question

CORRECT!

Quiz Question:

Suppose at least one person volunteers and the other 4 members in your group do not.

In a hypothetical round of the game, which of the following options is correct?

Quiz Answer:

Only the member who volunteered will hear the noise for a specific duration. The other 4 members will not be required to hear the noise.

Q3.2 Incorrect response for quiz question

INCORRECT!

Quiz Question: Suppose at least one person volunteers and the others in your group do not.

In a hypothetical round of the game, which of the following options is correct?

Quiz Answer:

In this hypothetical round, only one member volunteered and the 4 other members did not volunteer.

A rule of this game is that, if at least one member in your group volunteers to hear the noise, the other 4 members will not be required to hear the noise.

A second rule of this game is that the member who volunteered will hear the noise for a specific duration.

The noise durations you might acquire from all rounds will be summed together.

At the end of this session, you will be informed of your total noise duration and will be required to hear the noise for that duration.

The noise duration will vary in each round.

According to the first rule, the other 4 members will not hear the noise as there was one member from their group who volunteered. Only the member who volunteered will hear the noise.

The correct option is "a member who volunteered will hear the noise for a specific duration and the other members will not hear the noise".

Thus, the options that stated "only the member who volunteered will not hear the noise and the 4 other member will hear the noise" and "all members will not hear the noise" are incorrect.

The option where "all members will hear the noise for 15 seconds" is also incorrect because the noise duration will vary in each round and will not be set at 15 seconds only.

Q3.5 Group synchronization (Deception item)

This completes the quiz.

Please wait as the servers connecting you and your group members are now being synchronized.

This configuration process may take a while.



Please wait....
Please do not press Back or Refresh

Please click on '>>' once it appears to proceed to the game.

Q4.1 Example round of Volunteer's dilemma game

In this round, the duration of noise to hear is 3 seconds.

If a member volunteers, only he (or she) will hear the noise for 3 seconds.

If at least one member in your group volunteers to hear the noise for 3 seconds, then the other members who did not volunteer will not be required to hear the noise.

But, if NO ONE volunteers, all 5 members in your group including yourself, will be required to hear the noise for 3 seconds.

Do you choose to:

- VOLUNTEER (You will hear the noise for 3 seconds even if another member volunteers)
- REFRAIN (You will not hear the noise if another member volunteers)

Q4.2 Expectation item for participants who chose VOLUNTEER

In this round:

1. How likely do you think other members will volunteer?
2. When making my decision to volunteer, I aimed to help my group members.

Q4.3 Expectation item for participants who chose REFRAIN

In this round:

1. When making my decision to refrain, I assumed other players will volunteer.
2. When making my decision to refrain, I aimed to protect myself first.

Q10.4 Intergroup assignment (Deception item)

You have completed the first decision-making game.

Please wait for your other group members to finish the game.

Member 1



Member 2



Member 3



Member 4



You will be automatically directed to the next game
after all members have completed this game.

Q13.1 Instructions for IPD-MD+C game

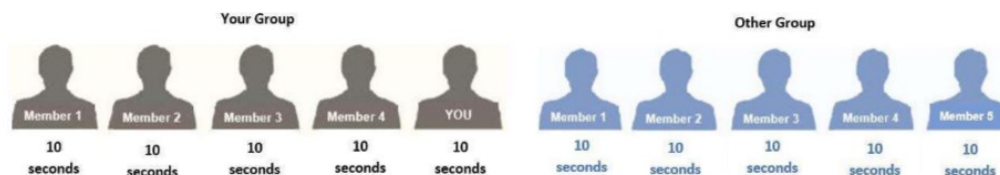
You and your 4 group members will play a new decision-making game with other groups.

In this game:

You will play MULTIPLE rounds with 4 group members. These 4 members are the same players who were in your group during the previous decision-making game.

Your group will be randomly matched to play with a new group of 5 players in each round. All members in the two groups are required to hear the noise played in the previous game.

Members in the other group may aim to change the noise duration for your group. Every member in the two groups, will receive 10 seconds of noise that he (or she) can choose to ALLOT or KEEP.



Q13.2 Each member in your group may choose to ALLOT any amount of his (or her) 10 seconds of noise in all or any Pool(s), or KEEP the seconds of noise for himself (or herself).

ALLOT

Your group is given 3 Pools - A, B, and C - to allocate the seconds.

The descriptions of the 3 Pools are as follows.

Pool A: Every second allocated to Pool A will be doubled and then divided equally across each member in your group, including yourself. You and your 4 group members will each receive an equal share of the noise to hear individually.

Pool B: Each second allotted to Pool B will give 1 second of the noise to the other group to hear. Simultaneously, your group will receive 1 second of the noise to hear. All members in the other group will be given an equal share of this noise to hear individually. You and your 4 group members will each receive an equal share of this noise to hear individually.

Pool C: Every second allocated to Pool C will be doubled and then divided

equally across the 5 members in the other group. These seconds will be used to increase the duration of the noise that each member in the other group will hear individually. The doubled seconds will not be given to your group.

KEEP: Every second that is kept and not allotted to any Pool, will be used by the member to hear the noise ONLY for himself (or herself). These seconds will not be doubled and will not be distributed to members in your group and the other group.

The Other Groups:

The other groups are given their Pools A, B, and C, where each member can allot or keep any amount of his (or her) 10 seconds. Members in the other group may allocate to their Pools B and C, which may affect the noise duration for your group. Similarly, you and your group members may allot to your group's Pools B and C, to affect the noise duration for the other group. Members may also allot in their respective Pool A to reduce the noise duration for their group. Hence, the decisions that members in the other group and members in your group make, will affect outcomes (such as shorter or longer noise durations) for their group as well as your group.

Q13.3 At the start of each round:

Each member in both groups will receive an individual pool of 10 seconds of noise.

You and your group members will be shown how each player in the other group has decided to invest his (or her) seconds of noise to the three Pools.

The pool investments of members in the other group are based on their final decisions and are not allowed to be adjusted.

At the end of this experiment:

The noise duration that you would be required to hear, for each round, will be summed together with the consecutive rounds. You will be informed of this summed duration and will be required to hear the noise for that duration (in addition to the total noise duration from the prior game).

Q13.4 You will be shown an EXAMPLE ROUND and SCENARIO in this game.

=====

This is an EXAMPLE ROUND in this game.

In this round, the other group has decided to increase the noise duration by 20 seconds. These 20 seconds will be equally divided among the 5 members in your group to hear.

The pool allotments of the other group are as follows:

	Member 1	Member 2	Member 3	Member 4	Member 5	Total Contributions (by Pool)
Pool A allotment	0	0	0	0	1	1
Pool B allotment	1	0	0	1	0	2
Pool C allotment	3	2	2	2	0	9

Based on the other group's allocations to Pools B and C,
the noise duration for your group will increase by:

$$2 \text{ (from Pool B)} + (9 \times 2) \text{ (from Pool C)} = 20 \text{ seconds}$$

The other group's Pools B and C contributions divided equally among your
group: $20 \text{ seconds} / 5 = 4 \text{ seconds}$

The noise duration each member in your group is required to hear: 4 seconds

Thus, each member in your group will be required to hear the noise for 4
seconds.

You have 10 seconds that you can allot to Pool A, Pool B, Pool C, or keep for
yourself.

POOL A

Every second allocated to Pool A will be doubled and then divided equally
across each member in your group, including yourself.

You and your 4 group members will each receive an equal share of the noise to
hear individually.

POOL B

Each second allotted to Pool B will increase 1 second of the noise for the other
group to hear. Simultaneously, your group will receive 1 second of the noise to
hear.

All members in the other group will be given an equal share of this noise to
hear individually. You and your 4 group members will each receive an equal
share of this noise to hear individually.

POOL C

Every second allocated to Pool C will be doubled and then divided equally
across the 5 members in the other group. These seconds will be used to increase
the duration of the noise that each member in the other group will hear
individually. The doubled seconds will not be given to your group.

KEEP

Every second that is kept and not allotted to any Pool, will be used by the

member to hear the noise ONLY for himself (or herself). These seconds will not be doubled and will not be distributed to members in your group and the other group.

How many seconds would you ALLOT to the 3 Pools in your group?

Q13.5 Explanation for example round in the IPD-MD game.

This is an EXAMPLE SCENARIO in this game.

Imagine that, from your 10 seconds of noise, you allocate 2 seconds to Pool A, 3 seconds to Pool B, 2 seconds to Pool C, and keep 3 seconds for yourself.

Suppose that Members 1 and 3, individually allot 3 seconds to Pool B, while Member 4 allots 8 seconds in Pool A.

Member 2 did not allot any seconds.

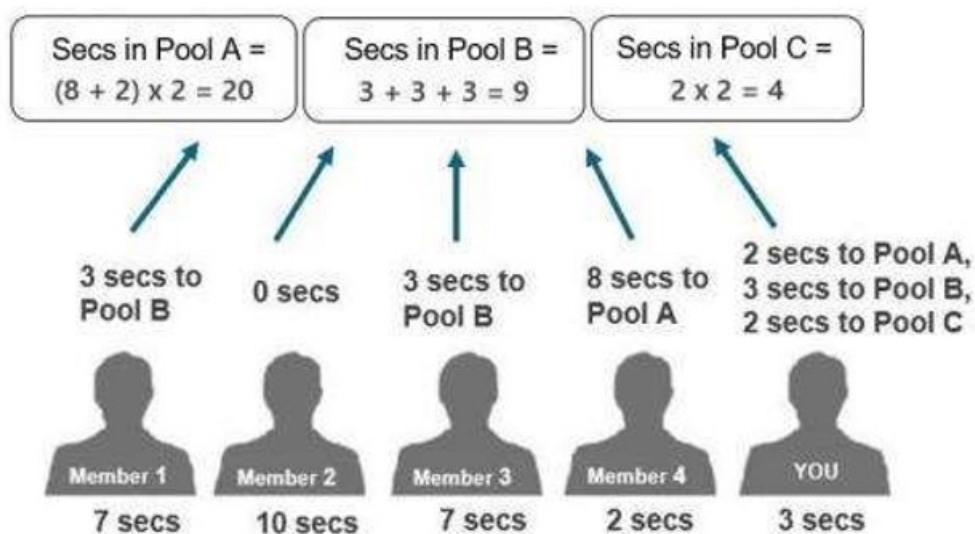
Members 1 and 3 are left with 7 seconds of noise, Member 4 has a balance of 2 seconds of noise, and Member 2 has 10 seconds of noise.

The total allotments made by you and your members, to each Pool, are as follows:

Your group's Pool A: [2 (your contribution) + 8 (contribution from Member 4)] x 2 = 20 seconds

Your group's Pool B: 3 (your contribution) + 6 (contributions from Members 1 and 3) = 9 seconds

Your group's Pool C: 2 (your contribution) x 2 = 4 seconds



Based on your group's Pools B and C allotments, the noise duration for the other group will increase by: $9 + 4 = 13$ seconds

From the total number of seconds in your group's Pools A and B, each member in your group will hear: $29 / 5 = 5.8$ seconds of noise
From the other group's Pools B and C allocations, the noise duration each member in your group had to hear was: $20 / 5 = 4$ seconds

Thus, from the pool allocations in this round, each member in your group is required to hear the noise for: $5.8 + 4$ seconds = 9.8 seconds

At the end of this round,

Member 1 will hear the noise for: $9.8 + 7$ (seconds that were kept) = 16.8 seconds

Member 2 will hear the noise for: $9.8 + 10$ (seconds that were kept) = 19.8 seconds

Member 3 will hear the noise for: $9.8 + 7$ (seconds that were kept) = 16.8 seconds

Member 4 will hear the noise for: $9.8 + 2$ (seconds that were kept) = 11.8 seconds

You will hear the noise for: $9.8 + 3$ (seconds that were kept) = 12.8 seconds

Q14.2 Quiz Question:

Only Member 4 in your group allots 3 seconds in Pool A and 3 seconds in Pool C.

All other members of your group do not contribute to the pools.

How many seconds will be added to the noise duration for the other group based on Member 4's decision?

- 4
- 6
- 8
- 10

Q14.3 Correct response to quiz question

CORRECT!

Quiz Question: Member 4 in your group allots 3 seconds in Pool A and 3 seconds in Pool C. All other members of your group do not contribute to the pools. How many seconds will be added to the noise duration for the other group based on Member 4's decision?

Quiz Answer: The 3 seconds contributed to Pool C by Member 4 will increase the noise duration for the other group by 6 seconds. Based on the rules of the game, allotting 1 second in Pool C will double the seconds of noise duration for

the other group. However, the 3 seconds that Member 4 contributed in Pool A will not affect the other group and will not cause a loss to the other group. Allotting 1 second to Pool A will be doubled and these doubled seconds will be evenly split among your group members, including yourself, to hear the noise.

Q14.4 Incorrect response to quiz question

INCORRECT!

Quiz Question: Member 4 in your group allots 3 seconds in Pool A and 3 seconds in Pool C.

All other members of your group do not contribute to the pools.

How many seconds will be added to the noise duration for the other group based on Member 4's decision?

Quiz Answer: Based on Member 4's decision, the noise duration for the other group will increase by 6 seconds.

Allocating 1 second in Pool C will increase the noise duration by 2 seconds for the other group.

The 3 seconds invested by Member 4 will thus be doubled and will give the other group an increase of 6 seconds.

The other options that stated 4, 8, and 10 are incorrect.

Based on the rules of the game, the 3 seconds contributed to Pool A will not cause a loss to the other group. Allotting 1 second to Pool A will be doubled and these doubled seconds will be evenly divided among your group members, including yourself, to hear the noise.

The noise duration will be increased for the other group only when contributions are made to Pools B and/or C.

Q14.8 Intergroup assignment (Deception item)

This completes the quiz.

**The host servers of the other groups are now
being connected to your group.**

This configuration process may take a while.



Please wait...
Please do not press Back or
Refresh

Please click '>>' once it appears to proceed.

Q14.9 Intergroup assignment (Deception item)

**Your group is matched to
GROUP 3.**

**You and your group members will play this round with
GROUP 3.**

Please be patient as this configuration request may take some time.



You will be automatically directed to proceed.

Q15.1 Example round of IPD-MD+C game (Anticipations of outgroup hostility)

In this round, how many seconds do you think Group 3, as a whole, might have kept for themselves and allotted to each of their three Pools?

In Pool A, every second allocated will be doubled and then divided equally across each member in your group, including yourself. You and your 4 group members will each receive an equal share of the noise to hear individually.

In Pool B, each second allotted will increase 1 second of the noise for the other group to hear. Simultaneously, your group will receive 1 second of the noise to hear.

All members in the other group will be given an equal share of this noise to hear individually. You and your 4 group members will each receive an equal share of this noise to hear individually.

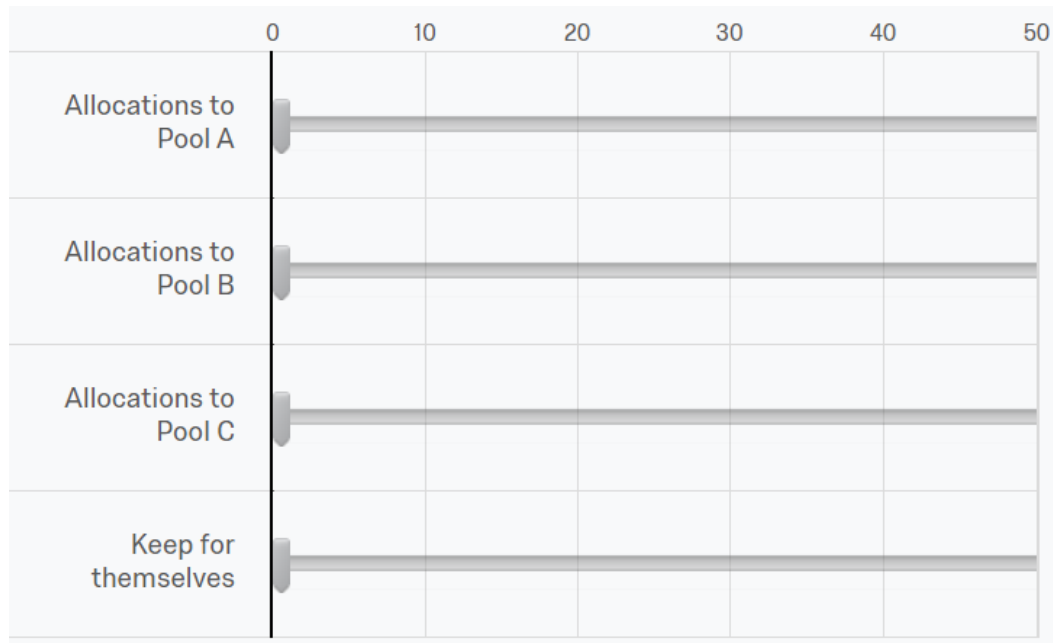
Allotting one second to Pool C will be doubled and then divided equally across the 5 members in the other group. These seconds will be used to increase the duration of the noise that each member in the other group will hear individually. The doubled seconds will not be given to your group.

Every second that is kept and not allotted to any Pool, will be used by the member to hear the noise ONLY for himself (or herself). These seconds

will not be doubled and will not be distributed to members in your group and the other group.

How many seconds would you ALLOT to the 3 Pools in your group?

The allocations you make to the three Pools and the allocations you keep for yourself, must total to 10.



Q15.2 Example round of IPD-MD+C game

Group 3 has decided not to allot any seconds to increase the noise duration for your group.

The pool allocations of Group 3 are as follows:

	Member 1	Member 2	Member 3	Member 4	Member 5	Total Contributions (by Pool)
Pool A allocation	6	4	5	5	8	28
Pool B allocation	0	0	0	0	0	0
Pool C allocation	0	0	0	0	0	0

Based on Group 3's allocations to Pools B and C, the noise duration for your group will increase by: 0 (from Pool B) + (0×2) (from Pool C) = 0 seconds

Thus, each member in your group will not be affected by Group 3's allocations.

You have 10 seconds that you can allot to Pool A, Pool B, Pool C, or keep for yourself.

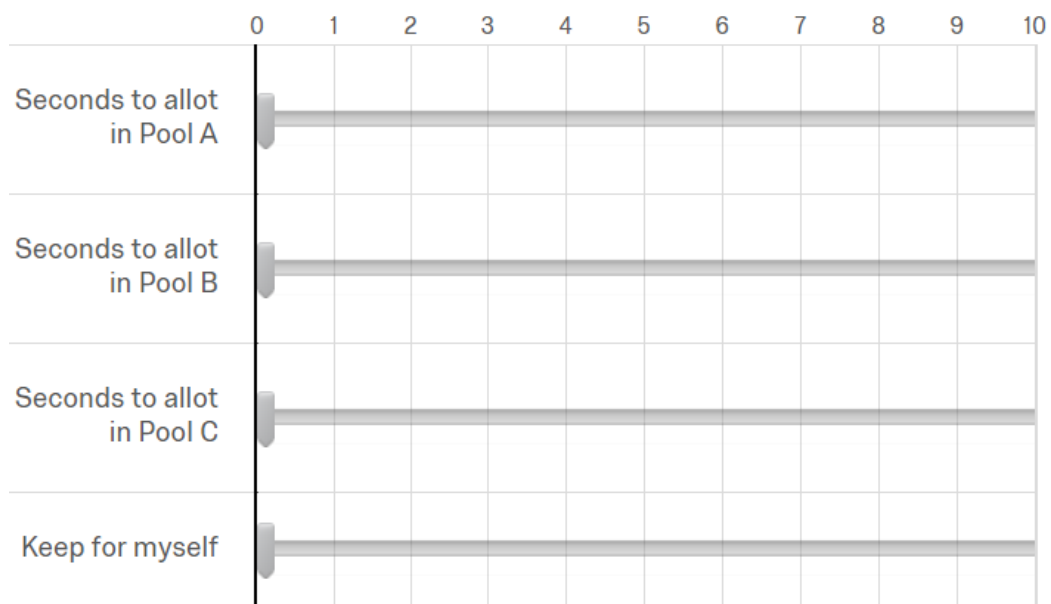
In Pool A, every second allocated will be doubled and then divided equally

across each member in your group, including yourself. You and your 4 group members will each receive an equal share of the noise to hear individually.

In Pool B, each second allotted will increase 1 second of the noise for the other group to hear. Simultaneously, your group will receive 1 second of the noise to hear. All members in the other group will be given an equal share of this noise to hear individually. You and your 4 group members will each receive an equal share of this noise to hear individually.

Allotting one second to Pool C will be doubled and then divided equally across the 5 members in the other group. These seconds will be used to increase the duration of the noise that each member in the other group will hear individually. The doubled seconds will not be given to your group. Every second that is kept and not allotted to any Pool, will be used by the member to hear the noise ONLY for himself (or herself). These seconds will not be doubled and will not be distributed to members in your group and the other group.

How many seconds would you ALLOT to the 3 Pools in your group?
 The allocations that you make to the three Pools and allocations that you keep for yourself, must total to 10.



Q15.3 Expectation items after each round

Please answer the following questions regarding your decision in this round:

My allotments were aimed at increasing the noise duration for members of Group 3.

1. My allotments were aimed at helping my group members by minimizing our noise duration.

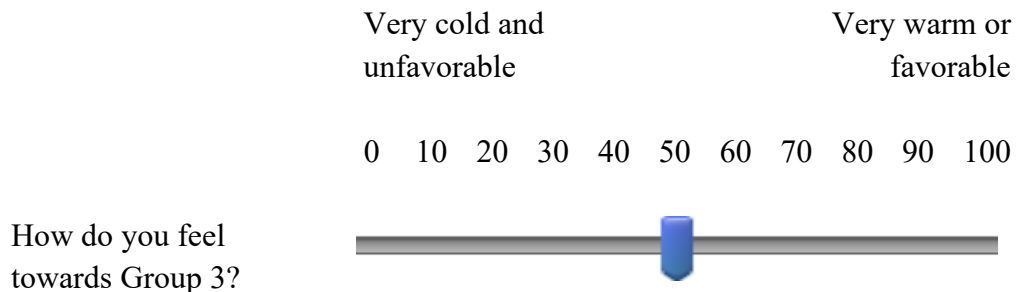
2. How competitive do you think Group 3 is?
3. How hostile do you think Group 3 is?
4. How fair do you think Group 3 is?
5. How harmful do you think Group 3's allocations were for your group?
6. How bothered were you by Group 3's allocations?

Q15.4 Feeling thermometer scale

How do you feel towards Group 3?

Please provide a number from 0 to 100 where 0 represents very cold or unfavorable feeling and 100 represents very warm or favorable feeling. If you didn't feel particularly warm or cold toward a group, you could rate it at the 50-degree mark.

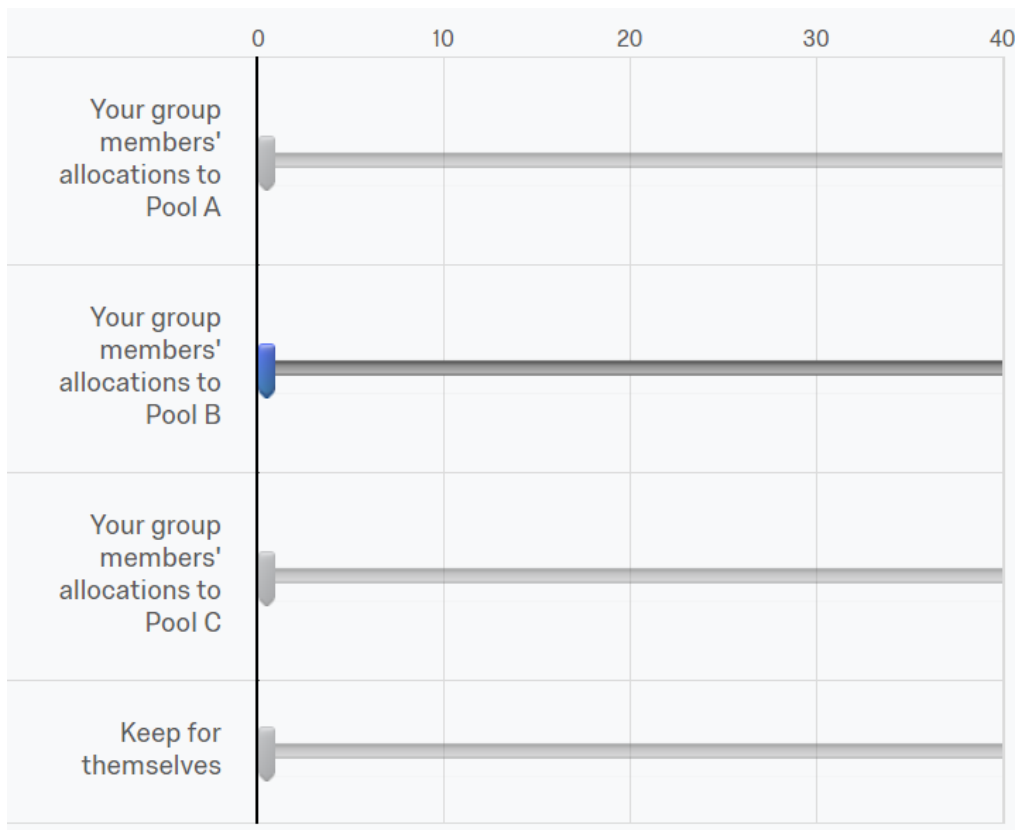
You may click and drag on the bar to indicate your response.



Q15.5 Please answer the following questions regarding your group members' decisions in this round.

How many seconds do you think your 4 group members, as a whole, might have kept or allotted to each Pool?

The allocations to the three Pools and allocations kept for themselves, must total to 40.



Q18.1 Expectation items of self, ingroup, and outgroup

Please answer the following questions regarding your decisions in the rounds that involved the other groups.

1. When making my decisions, I aimed to obtain good outcomes for myself.
2. When making my decisions, I tried to maximize my personal gain.
3. When making my decisions, I assumed other members in my group will contribute their seconds.
4. When making my decisions, I wanted to increase the noise duration of the other group.
5. When making my decisions, I wanted to make sure my group will hear the noise much lesser than the other group.
6. When making my decisions, I wanted to help my group members by minimizing the noise duration we had to hear.
7. I expected members of the other group to minimize the noise duration for themselves.
8. I expected members of the other group to increase the noise duration for my group.

Q18.2 Game completion (Deception item)

This concludes the decision-making games.

**The seconds you have accumulated
on the games are being calculated.**

**You will be informed of your total noise duration and
will then be asked to hear the noise for this duration,
at the end of this session.**



calculating..

Please click '>>' to proceed to answer a series of surveys
regarding your preferences and opinions.

Q19.3 Funnelling approach item (Manipulation checks)

Please write a few sentences on what you think were the aims of this study.

Q19.4 Funnelling approach item (Manipulation checks)

Please indicate how anxious are you to hear the noise.

Not at all

Highly
anxious

0 10 20 30 40 50 60 70 80 90 100

How anxious are you to hear the
noise?



Q19.5 Funnelling approach item (Manipulation checks)

Was there anything that strike you as particularly strange or odd?

If Yes, please elaborate and describe what you thought was unusual.

- Yes
- No

Q19.6 Funnelling approach item (Manipulation checks)

Did you believe that you were playing with other people?

If No, please elaborate.

- Yes
- No

Q19.7 Funnelling approach item (Manipulation checks)

Did you believe that you will hear the noise?

If No, please elaborate.

- Yes
- No

Q24.1 Debriefing statement

Thank you for participating in our experiment. This study seeks to better understand how people behave and make decisions in social contexts. Specifically, we are interested in how different demands and pressures on groups may affect cooperation and competition in groups.

We request that you do not share this information with others, since prior knowledge about this aspect of our experiment may adversely affect from future participants. If you choose to withdraw your data from the study based on the information provided on this debriefing, you may do so. You will still receive your compensation for participating in the study even if you choose to withdraw your data.

In addition, please feel free to contact Dr. Bobby Cheon (bkcheon@ntu.edu.sg) if you have any questions or concerns about the study.

Once again, we thank you for your participation in this experiment.

If you have any questions or comments about the study or any other comments, please enter them below. Also, please let us know about any instructions or rules of the decision-making game that were unclear or difficult to understand.

After you have completed, please proceed to see the researcher at the front desk.

Appendix D: Survey questionnaire for Study 4

Q1 Study Information sheet

Name of PI: Dr. Bobby Cheon

Institution and contact details: School of Humanities and Social Sciences,
Nanyang Technological University and bkcheon@ntu.edu.sg

IRB reference number: IRB-2015-09-023-04

Title of Study: Contextual influences on Decision-making in Group Contexts
Study

Objective: The aim of this study is to examine how individuals' perception and interpretation of social situations influence their decisions in social contexts.

Procedures:

During this study you may be asked to:

- Complete social decision-making tasks in which you make choices that affect your own outcomes, as well as the outcomes of other participants. Decisions involve choices such as allocation of resources or responsibilities. Your decisions will affect outcomes such as points or credits earned in the decision-making task, which may be used to determine bonus payment that you and other participants can earn during the experiment.
- Perform a task or responsibility that may be assigned to you by one or more member/s of your group or another group. The task or responsibility that is allocated to you or assigned by you to others may have components that are aversive or strenuous.
- You may be asked to view images, write about, manipulate, handle, and make decisions regarding different types of resources. This includes resources such as points that may be exchanged for rewards in decision-making tasks or money.
- You may be asked to view, categorize, and rate images of social scenes or faces of people that belong to different social or ethnic groups.
- You may be asked to recall, imagine, and write short descriptions about your thoughts and emotions towards potentially uncomfortable scenarios.
- Complete a series of surveys regarding your attitudes, opinions, and beliefs about yourself, your relationship with others, and social issues.

Right to Refuse or Withdraw:

Your participation in this study is completely voluntary, and you may withdraw from the study at any time without penalty (however, you will not receive course credit for this study). You may skip over any questions or procedures that you do not wish to answer, or you may withdraw by informing the research associate that you no longer wish to participate.

Your decision to participate, decline, or withdraw participation will have no effect on your status.

Risks and Discomforts:

There are no anticipated risks, beyond those encountered in daily life, associated with participating in this study.

Benefits:

Upon completion, you will receive an explanation of the study and the hypotheses. We also hope that you will learn a little bit about how psychological research is conducted.

Compensation:

You will receive \$1 dollar in compensation for participating in this experiment.

Anonymous and Confidential Data Collection:

Data collection will be kept confidential and personally identifying information will not be stored with your data.

Confidentiality of records:

All data and consent forms will be stored in a locked room or on password protected computers/storage devices. Results of this study may be presented at conferences and/or published in books, journals, and/or in the popular media.

Personal Data:

Your participation in this study will remain confidential, and your identity will not be stored with your data. Your responses will be assigned a code number that is not linked to your name or other identifying information.

By signing the Consent Form attached, you (*or your legally acceptable representative, if relevant*) are authorizing (i) collection, access to, use and storage of your “Personal Data”, and (ii) disclosure to, and use and storage by, authorised service providers and relevant third parties, whether located in Singapore or overseas, for the purposes of the study.

“Personal Data” means data about you which makes you identifiable: (i) from such data; or (ii) from that data and other information which an organisation has or likely to have access. This includes medical conditions, medications, investigations and treatment history.

Research arising in the future, based on this “Personal Data”, will be subject to review by the relevant institutional review board.

Data collected are the property of Nanyang Technological University. In the

event of any publication regarding this study, your identity will remain confidential.

Who to contact with questions:

If you have any enquiries concerning the study in the future, please feel free to contact Dr. Bobby Cheon (bkcheon@ntu.edu.sg) at School of Humanities and Social Sciences, Nanyang Technological University.

Should you have questions on participants' rights in the study, please contact:

NTU-Institutional Review Board
Research Integrity and Ethics Office
50 Nanyang Avenue, North Spine
NS4-05-92A
Singapore 639798
Email: irb@ntu.edu.sg

Consent Form: I have read, discussed and understand the information and procedures in the study information sheet attached to this consent form. My questions concerning the study have been answered to my satisfaction, and I acknowledge that I am participating in this study of my own free will. I understand that I may refuse to participate or stop participating at any time.

Consent to participate in the research

- YES, I AGREE to participate in this study (this will start the study)
- NO, I DO NOT AGREE to participate in this study (please close the browser window)

Q2 Introduction to the study

Welcome!

Thank you for taking the time to participate in this study.

During this study, you will be asked to complete two tasks.

The first task will require you to share your opinions and experiences in writing.

For the second task, you will be asked to answer a number of short surveys.

Please complete this survey in one sitting. Also, please do not access other websites while you are working on this survey. There are no wrong answers.

Please provide the responses that most accurately reflect your attitudes and opinions.

Please pay attention and read the instructions carefully before you begin.

Q3 Identity fusion manipulation task (Experimental condition)

In this section, we are collecting opinions from the American public on social issues. Below, you will be asked to write a short essay about your opinions.

You may advance to the next page after at least 2 minutes have passed.

American society is facing a lot of problems nowadays. Domestically, Americans face problems in high cost of living, income inequality, economic uncertainty, and shortage of resources such as living space and clean water, to name a few. On the international front, Americans face challenges of competing with other nations on political and economic matters. With these in mind, we are interested in knowing what you think about how people in the U.S. can be united to build a better society. Please write a short essay (at least 100 words) concerning this topic. Start your essay with “We as Americans ...”.

Q4 Identity fusion manipulation task (Control condition)

In this section, we are collecting people’s opinions on their daily routines. Below, you will be asked to write a short essay about your daily activities. You may advance to the next page after at least 2 minutes have passed.

Many people reject routines because they prefer being adventurous, to go with the flow, and keep their schedules open-ended. However, keeping a daily routine creates a structure for day-to-day tasks, eliminates distractions, and increases efficiency. Regular routines provide a sense of ownership, self-satisfaction, and accomplishment. When implementing a daily routine, there are many factors to consider including motivation and the availability of necessary resources. With these in mind, we are interested in knowing what you think about how you organise and complete your daily activities. Please write a short essay (at least 100 words) concerning this topic. Start your essay with “Each day, I...”.

Q5 Identity fusion scale (Manipulation check)

We would like you to answer the following statements about your relationship to America. Please read each statement and indicate on the scale to what extent you would agree.

1. My country is me.
2. I am one with my country.
3. I feel immersed in my country.
4. I have a deep emotional bond with my country.
5. I am strong because of my country.

6. I'll do for my country more than any of other group members would do.
7. I make my country strong.

Q7 Readiness to self-sacrifice scale

We would like to know your level of agreement towards the following statements.

Please read and respond to each statement according to the following scale.

1. It is senseless to sacrifice for America.
2. I would defend America, even if my loved ones rejected me.
3. I would be prepared to endure intense suffering if it meant defending America.
4. I would not risk my life for America.
5. There is a limit to what one can sacrifice for America.
6. My life is more important than America.
7. I would be willing to give away all my belongings to support America.
8. I would not be ready to give my life away for America.
9. I would be ready to give up all my personal possessions for America.
10. I would be ready to give my life for America.

Q8 Outgroup threat severity vignette (Low threat manipulation)

We are interested in your opinion regarding some groups that are currently active in social and political life in the U.S.

Imagine an organization based in America who are ultraconservative Muslims and are advocating Islamic fundamentalist beliefs and practices. This group champions principles and values interpreted from orthodox Islamist doctrines that forbid marriages between Muslims and non-Muslims, depict pluralism and liberalism as incompatible with the Islamic civilisation and encourage the enforcement of Sharia law as the way to solve and stop problems like racism, corruption, drug abuse, homosexuality and promiscuity. The group has issued an official announcement on its website that it is not linked to or sympathizes with any domestic or international terrorist network. These claims have indeed been confirmed to be accurate based on joint investigative probes conducted by the Department of Justice, Department of Homeland Security, and the FBI. The group has been losing support from its present members, mosque organisations, and charity donors across the U.S. The group has engaged in both online and offline efforts to spread awareness of its brand of Islam and increase membership, through several outreach programs that include distribution of pamphlets and audio-visual recordings of their sermons catered for children and adults. Overall, these efforts have been largely unsuccessful. Recent events like private group discussions and talks on the historical development of Islamist theory that the group organised, have been poorly attended. The remaining members of this group are currently seeking for a better recognition of their interests in the U.S. and have planned to conduct public rallies and

demonstrations which are expected to receive limited levels of interest and attendance.

Q9 Outgroup threat severity vignette (High threat manipulation)

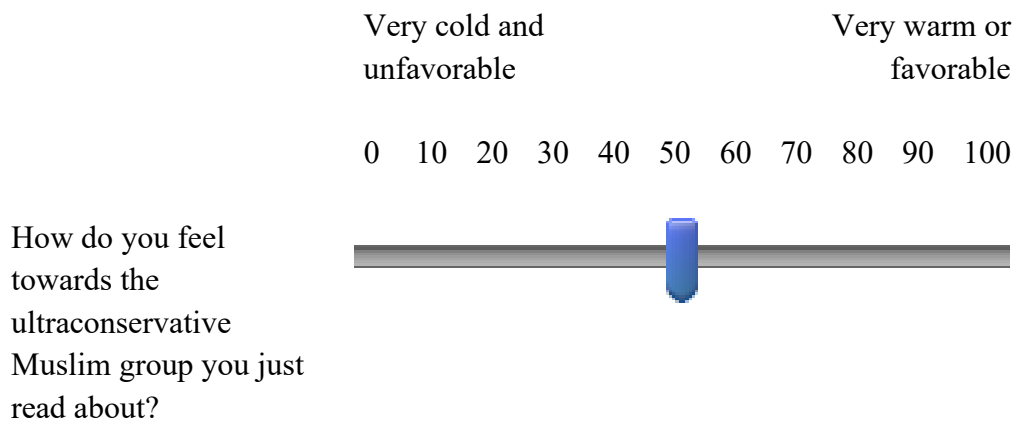
We are interested in your opinion regarding some groups that are currently active in social and political life in the U.S.

Imagine an organization based in America who are ultraconservative Muslims and are advocating Islamic fundamentalist beliefs and practices. This group champions principles and values interpreted from orthodox Islamist doctrines that forbid marriages between Muslims and non-Muslims, depict pluralism and liberalism as incompatible with the Islamic civilisation and encourage the enforcement of Sharia law as the way to solve and stop problems like racism, corruption, drug abuse, homosexuality and promiscuity. The group has issued an official announcement on its website that it is not linked to or sympathizes with any domestic or international terrorist network. These claims have indeed been confirmed to be accurate based on joint investigative probes conducted by the Department of Justice, Department of Homeland Security, and the FBI. The group has a growing community of strong supporters, mosque organisations, and charity donors across the U.S. The group has engaged in both online and offline efforts to spread awareness of its brand of Islam and increase membership, through several outreach programs that include distribution of pamphlets and audio-visual recordings of their sermons catered for children and adults. Overall, these efforts have been very successful. Recent events like private group discussions and talks on the historical development of Islamist theory that the group organised, have been well-attended. The growing members of this group are currently seeking for a better recognition of their interests in the U.S., and plan to conduct public rallies and demonstrations which are expected to receive high levels of interest and attendance.

Q10 Feeling thermometer scale

We would like to know what your general feelings are about the ultraconservative Muslim group you just read about.

Please provide a number from 0 to 100 where 0 represents very cold or unfavorable feeling and 100 represents very warm or favorable feeling. If you didn't feel particularly warm or cold toward the group, you could rate it at the 50-degree mark. You may click and drag the slider to indicate your response.



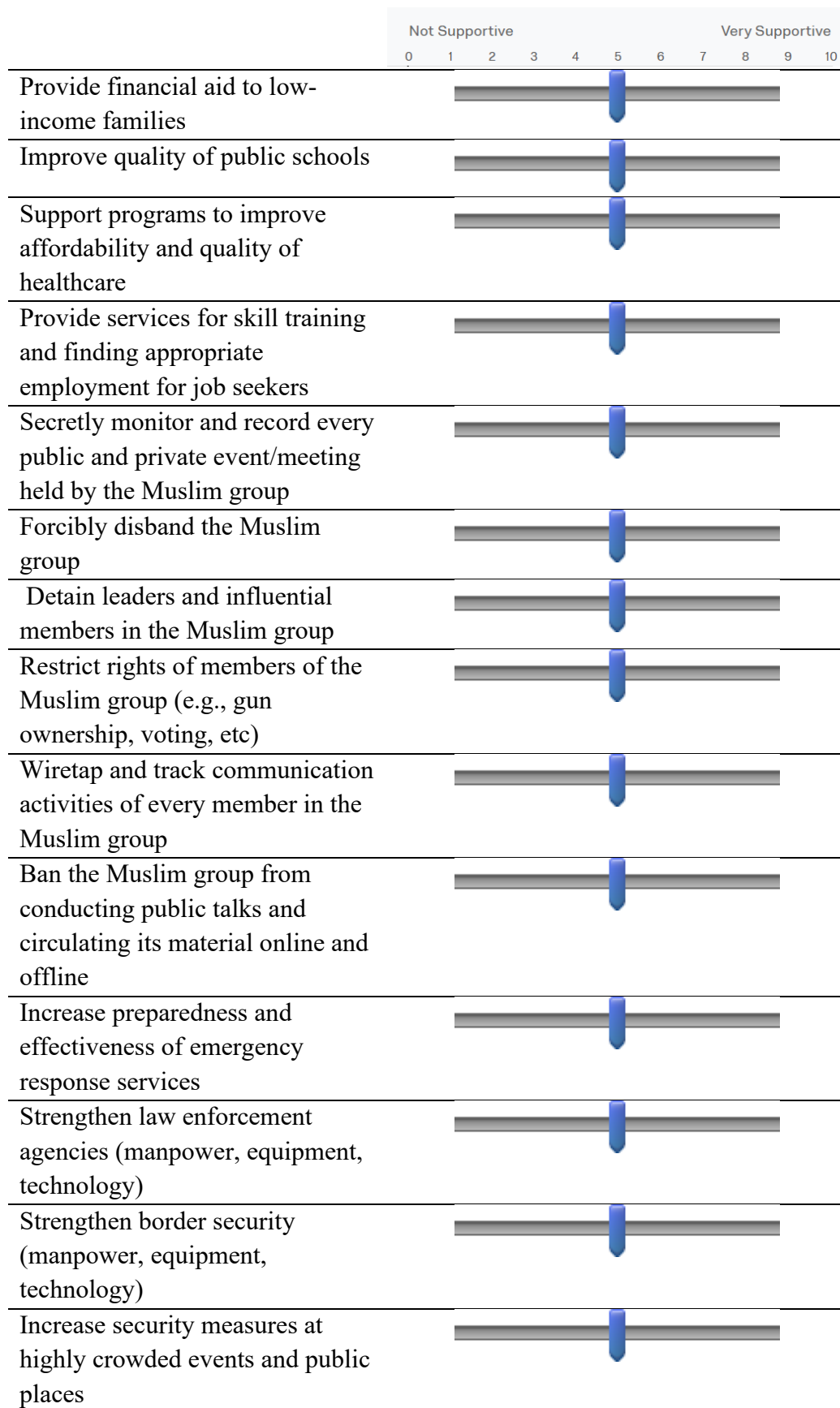
Q11 Anticipations of outgroup hostility scale

Next, we would like to know your opinions of this ultraconservative Muslim group's presence in the U.S. Please answer the following questions and indicate your response on the scale provided.

1. How aggressive is this group towards America?
2. How hateful is this group towards America?
3. How friendly is this group to America?
4. How harmful is this group to America?
5. How hostile is this group to America?
6. How safe is this group to America?
7. How supportive are you of this group?
8. How sympathetic do you feel towards this group?
9. How fearful are you of this group?
10. How worried are you of this group?

Q13 Policy support scale

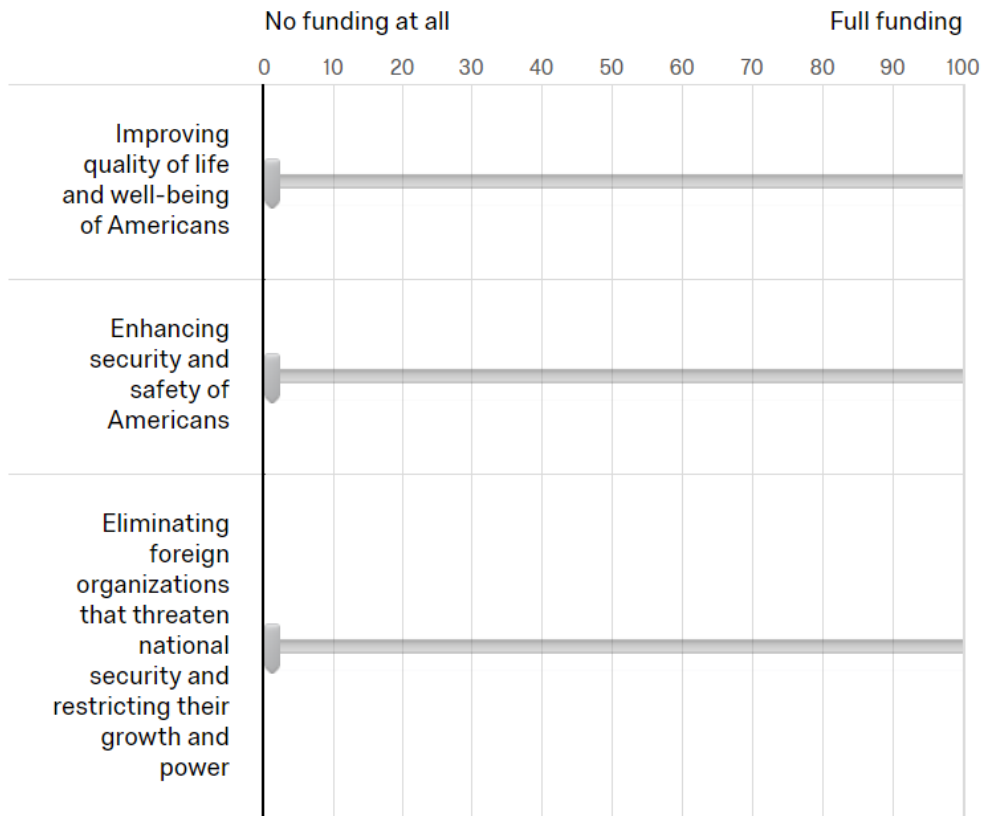
Suppose that the government has additional funds collected from U.S. taxpayers that could be applied to different programs and policies. For each of the programs/policies described below, please indicate how much you support applying the additional funds to implement them. Please assume that each program/policy will be effective in accomplishing its goals if it is funded. You may click and drag the slider to respond to each program/policy according to the following scale (Not at all supportive = 0, Very supportive = 10).



Q14 Forced choice policy support measure

Suppose that the government has limited funding that could be applied to one of the following types of programs/policies. Please indicate what percentage of these funds should be allocated to each of the objectives described below. Please make sure the amount of funding allocated to the programs/policies add up to 100%.

What percentage of these limited funds should be allocated to each of the objectives?

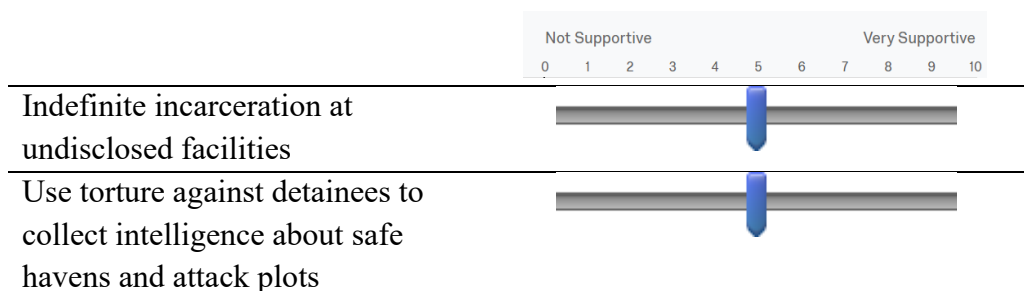


Q15 Policies toward actual terror groups

We would like to know your opinions of the programs and policies that should be taken towards actual terrorist groups.

Please indicate your level of support for each of the programs/policies described below.

You may click and drag the slider according to the following scale.



Impose harsher punishments (e.g., longer prison sentences, greater likelihood of death penalty) for those convicted of terrorism-related offenses



Authorize greater frequency and intensity of drone strikes on foreign terrorist hideouts located within civilian centers



Q16 Posse scale

Imagine that someday in the future the U.S. government passed a law outlawing Muslim groups that support and spread radical fundamentalist views. Government officials then stated that the law would only be effective if it were vigorously enforced at the local level and appealed to everyone to aid in the fight against these groups. Please respond to each statement according to the following scale.

1. I would tell my friends and neighbours it was a good law.
2. I would tell the police about any persons and groups who hold radical fundamentalist views I knew.
3. If asked by the police, I would help hunt down and arrest persons and groups with radical fundamentalist views.
4. I would participate in attacks on meeting places of radical fundamentalist groups if organized by the proper authorities.
5. I would support the use of physical force to make persons and groups who hold radical fundamentalist views reveal the identity of other members.
6. I would support the execution of persons and groups who hold radical fundamentalist views if the government insisted it was necessary to protect the country.

Q17 Vengeance scale

Please read each statement and indicate your level of agreement on the scale provided.

1. It is important for me to get back at people who have hurt me.
2. I try to even the score with anyone who hurts me.
3. I live by the motto 'let bygones be bygones'.
4. There is nothing wrong in getting back at someone who has hurt you.
5. I believe in the motto 'an eye for an eye; a tooth for a tooth'.
6. I find it easy to forgive those who hurt me.
7. If someone causes me trouble, I'll find a way to make them regret it.

8. If I'm wronged, I can't live with myself unless I get revenge.
9. Revenge is sweet.
10. Honour requires that you get back at someone who has hurt you.
11. Anyone who provokes me deserves the punishment that I give them.
12. People who insist on getting revenge are disgusting.
13. It's not worth my time or effort to pay back someone who has wronged me.
14. It is always better not to seek vengeance.
15. I don't just get mad, I get even.
16. I am not a vengeful person.
17. Revenge is morally wrong.
18. To have a desire for vengeance would make me feel ashamed.
19. It is usually better to show mercy than to take revenge.
20. It is always better to "turn the other cheek."

Q25 Debriefing statement

Thank you for participating in our experiment.

This study seeks to better understand how people behave and make decisions in group-relevant settings. Specifically, we are interested in understanding how various perceptions of threats may influence individual decision-making in groups, and how groups may collectively respond to deal with these stressors.

In this study, we predict that the imagination or recollection of potentially distressing or threatening incidents in your life or society will increase people's perceived identification with groups they belong to and their tendency to defend or enhance the welfare of other group members. For this reason, we needed to expose you to descriptions of events that may be threatening or distressing and ask you to think about these experiences.

Furthermore to assess potential tendencies to defend your own group or aggress against potentially threatening groups, we asked potentially sensitive questions about your willingness to self-sacrifice for your group or support actions that may harm other groups of people.

We request that you do not share this information with others, since prior knowledge about this aspect of our experiment may adversely affect from future participants.

If you choose to withdraw your data from the study based on the information provided on this debriefing, you may do so. You will still receive your compensation for participating in the study even if you choose to withdraw your data.

In addition, please feel free to contact Dr. Bobby Cheon (bkcheon@ntu.edu.sg) if you have any questions or concerns about the study. You may also contact the Nanyang Technological University Institutional Review Board (IRB) regarding your rights as a participant in the study (IRB@ntu.edu.sg). Once again, we thank you for your participation in this experiment.

Confirmation of understanding of the debriefing and consent for data to be used in the study: I confirm that I have read and understood the content of this debriefing statement, and that I am aware that some procedures and information provided to me during this experiment was artificial with the intention of eliciting feelings of threat or insecurity, especially towards other groups of people. I acknowledge that I am not experiencing any significant negative feelings as a result of the questions or procedures I have completed during this experiment, and that I agree to have my responses and data be maintained and analyzed for this study.

- I agree with the statement above
- I disagree with the statement above. Please do not include my data in this study (you will still receive reimbursement for completing the survey)

Q26 Comments

If you experience significant negative feelings or distress associated with the questions or measures you completed during this study, please contact the principal investigator: Assistant Professor Bobby Cheon (bkcheon@ntu.edu.sg). Thank you for your participation.

Please go to the next page to receive your survey completion code.

Appendix E: Pre-registration document for Study 5

Data collection. Have any data been collected for this study already?

Please choose. Note: 'Yes' is a discouraged answer for this preregistration form. (optional)

It's complicated. We have already collected some data but explain in Question 8 why readers may consider this a valid pre-registration nevertheless.

Hypothesis. What's the main question being asked or hypothesis being tested in this study? (optional)

We primarily seek to investigate whether individuals primed with sacrificial readiness and placed in an intergroup context would report greater anticipations of outgroup hostility and stronger perceptions of aggressive policies toward outgroups as a manifestation of actions motivated by concern and compassion for ingroup welfare ('ingroup love'), compared to participants in other conditions (who are primed with sacrificial readiness and in an intragroup context; who are not primed with sacrificial readiness and in an intergroup context; and who are not primed with sacrificial readiness and in an intragroup context).

First, we hypothesize that priming sacrificial readiness and the presence of an intergroup context will be associated with greater perceptions of harsh policies toward outgroups as actions motivated by concern and compassion for the ingroup, compared to other conditions. Second, we hypothesize that a moderated mediational model in which priming sacrificial readiness would predict strong inclinations to view harsh policies toward the outgroup as actions motivated by concern and compassion for the ingroup, through anticipations of outgroup hostility. In this model, the relationship between self-sacrificial readiness and anticipations of outgroup hostility is predicted to be moderated by vengeance and the presence of an intergroup context.

Dependent variable. Describe the key dependent variable(s) specifying how they will be measured. (optional)

The key dependent variable is attributions of 'ingroup love' (concern, compassion, and empathy) to Americans/America reflected in three types of policy programs: those that increase Americans' well-being (ingroup benefit), increase security for Americans (ingroup defense), and reflect aggressive countermeasures against foreign organizations that pose a potential threat/risk to U.S. security (outgroup aggression). Another dependent variable is the level of support toward funding these three policy programs that are based on ingroup benefit, ingroup defense, and outgroup harm. For the first dependent variable, participants are asked to rate how much concern for America/Americans is represented in the policy options pertaining to ingroup benefit, ingroup defense, and outgroup aggression. In the second dependent

variable, participants will be asked a forced-choice item which requires them to indicate their level of support toward three specific policy programs and the level of support should be totaled to 100%. Policy support scales will be researcher-constructed and will list policy options on ingroup benefit, ingroup defense, and outgroup harm.

Conditions. How many and which conditions will participants be assigned to?
(optional)

This study follows a 2 (Sacrificial readiness: High vs. Low) x 2 (Context type: Intragroup vs. Intergroup) between-subjects design. The Sacrificial readiness and Context type variables are between-subjects factors and will consist of two levels. There will be four conditions: (1) high sacrificial readiness and intergroup context; (2) high sacrificial readiness and intragroup context, (3) low sacrificial readiness and intergroup context; and (4) low sacrificial readiness and intragroup context.

Participants will be asked to individually read a compilation of excerpts from articles on a natural disaster in the U.S. The high sacrificial readiness condition will read excerpts that focus on shared pain and sacrifices made by Americans during the natural disaster incident. The low sacrificial readiness condition will read excerpts about the scientific facts, causes, and infrastructural damage of the natural disaster incident. Participants in the intergroup context condition will be asked to read excerpts of opinion articles on current domestic and global developments in China. In the intragroup condition, participants will be asked to read some excerpts from opinion articles about current pollution levels and issues in the U.S. The articles in the intragroup and intergroup conditions will be portrayed as being ambiguous threats to America.

Analyses. Specify exactly which analyses you will conduct to examine the main question/hypothesis.

(optional)

To test for interaction and main effects of sacrificial readiness and context type, two-way ANOVA analyses will be used to compare differences in the attributions of concern for America/Americans relating to policies on ingroup benefit, ingroup defense, and outgroup aggression. The same tests will be used to compare differences in support for policy programs (forced choice item) among the four conditions. Results from the ANOVA analyses are aimed at addressing the first hypothesis.

Anticipations of outgroup hostility will be used as a mediator and measured using items related to perceptions of potential aggression/harm intended from the outgroup. Vengeance will be used as a moderator and measured using the 20-item scale by Stuckless and Goranson (1992). Moderated mediation will be used to test the second hypothesis. The independent variable will be the

sacrificial readiness condition (high vs low), the mediator will be anticipations of outgroup hostility, and the dependent variable will be attributions of concern and compassion for the ingroup reflected by aggressive policies against the outgroup. The first moderator will be vengeance and the second moderator will be context type (intragroup vs intergroup). This model will be tested using two other dependent variables - attributions of concern and compassion for the ingroup reflected by policies benefitting welfare of the ingroup and attributions of concern and compassion for the ingroup reflected by policies for increasing general security/defense of the ingroup. For both hypotheses, the variables measuring participants' familiarity with the developments on China and pollution issues will be controlled for.

Outliers and Exclusions. Describe exactly how outliers will be defined and handled, and your precise rule(s) for excluding observations. (optional)
Participants with missing data and those whose nationality is not 'USA' will be excluded.

Sample Size. How many observations will be collected or what will determine sample size? No need to justify decision, but be precise about exactly how the number will be determined. (optional)

A total of 400 participants will be recruited, with 100 participants in each of the four conditions.

Other. Anything else you would like to pre-register? (e.g., secondary analyses, variables collected for exploratory purposes, unusual analyses planned?)
(optional)

Data from participants who follow the developments on China and pollution issues closely will be used as covariates when running the primary and secondary analyses. These variables reflect how concerned and informed participants are about current issues that relate to China and pollution in the U.S. We will exclude participants with missing data.

Raw data collection for this study has finished on the same day as this pre-registration, but no analyses or interpretations of the data have been conducted at the point of this pre-registration. Thus, we have no knowledge of what the results of outcomes of the study at the point this pre-registration is being submitted.

Name. Give a title for this As Predicted pre-registration. Suggestion: use the name of the project, followed by study description.
(optional)

Self-sacrificing prosociality and motives attributed to outgroup aggression

Finally. For record keeping purposes, please tell us the type of study you are pre-registering. (optional)
Other (describe below)

Other (optional) Experiment conducted using an online survey.

Appendix F: Survey questionnaire for Study 5

Q1 Study Information sheet

Name of PI: Dr. Bobby Cheon

Institution and contact details: School of Humanities and Social Sciences,
Nanyang Technological University and bkcheon@ntu.edu.sg

IRB reference number: IRB-2015-09-023-04

Title of Study: Contextual influences on Decision-making in Group Contexts
Study

Objective: The aim of this study is to examine how individuals' perception and interpretation of social situations influence their decisions in social contexts

Procedures: During this study you may be asked to:

- Complete social decision-making tasks in which you make choices that affect your own outcomes, as well as the outcomes of other participants. Decisions involve choices such as allocation of resources or responsibilities. Your decisions will affect outcomes such as points or credits earned in the decision-making task, which may be used to determine bonus payment that you and other participants can earn during the experiment.
- Perform a task or responsibility that may be assigned to you by one or more member/s of your group. The task or responsibility that is allocated to you or assigned by you to others may have components that are aversive or strenuous.
- You may be asked to view images, write about, manipulate, handle, and make decisions regarding different types of resources. This includes resources such as points that may be exchanged for rewards in decision-making tasks or money.
- You may be asked to view, categorize, and rate images of social scenes or faces of people that belong to different social or ethnic groups
- Complete a series of surveys regarding your attitudes, opinions, and beliefs about yourself, your relationship with others, and social issues.

Right to Refuse or Withdraw: Your participation in this study is completely voluntary, and you may withdraw from the study at any time without penalty (however, you will not receive course credit for this study). You may skip over any questions or procedures that you do not wish to answer, or you may withdraw by informing the research associate that you no longer wish to participate. Your decision to participate, decline, or withdraw participation will have no effect on your status.

Risks and Discomforts: There are no anticipated risks, beyond those encountered in daily life, associated with participating in this study.

Benefits: Upon completion, you will receive an explanation of the study and the hypotheses. We also hope that you will learn a little bit about how psychological research is conducted.

Compensation: You will receive compensation for participating in this experiment consistent with the amount indicated for this study on Prolific Academic.

Anonymous and Confidential Data Collection: Data collection will be kept confidential and personally identifying information will not be stored with your data.

Confidentiality of records: All data and consent forms will be stored in a locked room or on password protected computers/storage devices. Results of this study may be presented at conferences and/or published in books, journals, and/or in the popular media.

Personal Data: Your participation in this study will remain confidential, and your identity will not be stored with your data. Your responses will be assigned a code number that is not linked to your name or other identifying information. By signing the Consent Form attached, you (or your legally acceptable representative, if relevant) are authorizing (i) collection, access to, use and storage of your “Personal Data”, and (ii) disclosure to, and use and storage by, authorised service providers and relevant third parties, whether located in Singapore or overseas, for the purposes of the study.

“Personal Data” means data about you which makes you identifiable: (i) from such data; or (ii) from that data and other information which an organisation has or likely to have access.

Research arising in the future, based on this “Personal Data”, will be subject to review by the relevant institutional review board.

Data collected are the property of Nanyang Technological University. In the event of any publication regarding this study, your identity will remain confidential.

Research data containing your “Personal Data” will be transferred out of Singapore to collaborating research team members located abroad for the purposes described in this Consent Form. These collaborating research team members will take appropriate steps to ensure it complies with the data protection requirements in the Personal Data Protection Act while your “Personal Data” to be transferred remains in its possession or under its control.”

Who to contact with questions: If you have any enquiries concerning the study in the future, please feel free to contact Dr. Bobby Cheon

(bkcheon@ntu.edu.sg) at School of Humanities and Social Sciences, Nanyang Technological University.

Should you have questions on participants' rights in the study, please contact:
NTU-Institutional Review Board
Research Integrity and Ethics Office
50 Nanyang Avenue, North Spine
NS4-05-92A
Singapore 639798
Email: irb@ntu.edu.sg

Consent Form

I have read, discussed and understand the information and procedures in the study information sheet attached to this consent form. My questions concerning the study have been answered to my satisfaction, and I acknowledge that I am participating in this study of my own free will. I understand that I may refuse to participate or stop participating at any time.

Consent to participate in the research

- I AGREE to participate in this study (this will start the study)
- I DO NOT AGREE to participate in this study (please close the browser window)

Q4 Introduction to the study

Welcome!

Thank you for taking the time to participate in this study.

During this study, you will be asked to complete two tasks.

The first task will require you to share your opinions and experiences in writing.

For the second task, you will be asked to answer a number of short surveys.

There are no wrong answers.

Please provide the responses that most accurately reflect your attitudes and opinions.

Q5 Readiness to self-sacrifice vignettes (Low readiness to self-sacrifice manipulation task)

We would like you to read some excerpts of highly cited articles that were published in various climate science magazines and journals.

The 2011 Tornado Super Outbreak (25-28 April 2011) was one of the largest and deadliest natural disasters to strike the United States since 1932. Its massive winds reached estimated speeds as high as 205 miles per hour. The

thunderstorm remained very intense and violent as it weakened. Observations of Super Outbreak included data from satellites, aircraft reconnaissance missions, airborne and ground-based radars, conventional land-based surface and upper-air observing sites, ocean data buoys, and ships [1]. There was significant loss of life, extensive destruction of property, disruption of lifeline services, and the sources of livelihood were significantly impacted. More than 300 people died as a direct result of the tornado; 5, 484 were injured; and 200 were displaced and evacuated to community shelters. Over one million people had no electricity in hardest-hit cities [2]. Numerous Americans, from different walks of life, rushed in to offer their time, skills, and resources personally. Most volunteers and active community residents were new to this frontline situation and had not been involved in high-risk rescue operations in such an extensive disaster. Together, efforts by scores of civilian teams enabled many thousands of young, elderly, and disabled evacuees to receive basic food and water supplies and timely aid [3]. Choosing to do more than write a check, on-site and off-site volunteers assisted to make long-distance telephone calls, to create websites for donations and requests, to run errands to various locations, to share frequent-flier miles, and to provide boats and buses. Others offered to stable abandoned cattle, to share accommodations, and even to provide jobs and salaries. Self-deployed volunteer healthcare teams set up immediate medical care and counseling services at various locations. More than 52,000 volunteers were reported to have contributed a total of 325,095 volunteer hours [4].

[1] Knupp, K. R., Murphy, T. A., Coleman, T. A., Wade, R. A., Mullins, S. A., Schultz, C. J., ... & Carcione, B. (2014). Meteorological overview of the devastating 27 April 2011 tornado outbreak. *Bulletin of the American Meteorological Society*, 95(7), 1041-1062.

[2] Simmons, K. M., & Sutter, D. (2014). Fatality prediction for the 2011 tornado season based on historical extreme weather data. *Natural Hazards Review*, 15(3), 04014005.

[3] Smith, B., Castillo, M., & Gast, P. (April 30, 2011). *Volunteers rush to help after tornadoes*. CNN. Accessed: <http://www.cnn.com/2011/US/04/30/severe.weather/index.html>

[4] Reuter, C., Heger, O., & Pipek, V. (2013, May). Combining real and virtual volunteers through social media. In *Proceedings of the 10th International ISCRAM Conference*. Baden-Baden, Germany.

Q6 Readiness to self-sacrifice vignettes (High readiness to self-sacrifice manipulation task)

We would like you to read some excerpts of highly cited articles that were published in various climate science magazines and journals.

The 2011 Tornado Super Outbreak (25-28 April 2011) was one of the largest and deadliest natural disasters to strike the United States since 1932. Its massive winds reached estimated speeds as high as 205 miles per hour. The thunderstorm remained very intense and violent as it weakened. Observations of Super Outbreak included data from satellites, aircraft reconnaissance missions, airborne and ground-based radars, conventional land-based surface and upper-air observing sites, ocean data buoys, and ships [1]. Causing USD\$10.2 billion in damages, the 2011 Super Outbreak was one of the costliest catastrophes in U.S. history that left widespread economic impacts. Over 300 power grids, transmission towers, and pipeline infrastructure were extensively damaged. Communication systems, water distribution facilities, and pumping stations were rendered inoperable because of prolonged electricity disruption. Gas stations, bridges, and roads were submerged, carrying significant deposits of debris and further hindering traffic and recovery efforts [2]. Within four days, the supercells of 2011 Super Outbreak produced 362 confirmed, long-track tornadoes. Flash flooding occurred throughout ecologically sensitive parts of the region in the ensuing days due to the heavy rainfall. The storm uprooted and scattered swaths of trees and inundated the affected areas with raw sewage and contaminated mudflows where values of toxins and heavy metals exceeded standard levels [3]. The 2011 Super Outbreak flattened agricultural crops such as corn and almond, and wrecked farming equipment, poultry farms, and cattle ranches. The storm severely degraded biodiversity and terrestrial ecosystems such as forests, marine bodies, migratory species, and fisheries. As its powerful tornadoes scoured the ground out to a depth of 2 feet (0.61 m), the 2011 Super Outbreak caused substantial and long-term geographical loss and alteration of vegetated areas and wetlands [4].

[1] Knupp, K. R., Murphy, T. A., Coleman, T. A., Wade, R. A., Mullins, S. A., Schultz, C. J., ... & Carcione, B. (2014). Meteorological overview of the devastating 27 April 2011 tornado outbreak. *Bulletin of the American Meteorological Society*, 95(7), 1041-1062.

[2] Bunkers, M. J., & Baxter, M. A. (2011). Radar tornadic debris signatures on 27 April 2011. *Electron. J. Oper. Meteor*, 12(7), 1-6.

[3] FEMA. (2012). *Meteorological Background and Tornado Events of 2011*. Mitigation Assessment Team Report.

[4] LeComte, D. (2012). U.S. Weather Highlights 2011: Unparalleled Weather Extremes, *Weatherwise*, 65(3), 20-27.

Q7 Readiness to self-sacrifice scale

We would like to know your level of agreement towards the following statements. Please read and respond to each statement according to the following scale.

1. It is senseless to sacrifice for America.
2. I would defend America, even if my loved ones rejected me.
3. I would be prepared to endure intense suffering if it meant defending America.
4. I would not risk my life for America.
5. There is a limit to what one can sacrifice for America.
6. My life is more important than America.
7. I would be willing to give away all my belongings to support America.
8. I would not be ready to give my life away for America.
9. I would be ready to give up all my personal possessions for America.
10. I would be ready to give my life for America.

Q8 Identity fusion scale

We would like you to answer the following statements about your relationship to America. Please read each statement and indicate on the scale to what extent you would agree.

1. America is me.
2. I am one with America.
3. I feel immersed in America.
4. I have a deep emotional bond with America.
5. I am strong because of America.
6. I'll do for America more than any other Americans would do.
7. I make America strong.

Q9 Intergroup context vignette (Manipulation task)

We would like you to read some excerpts of opinion articles regarding current domestic and global activities in China.

It's something we've been hearing a lot of from analysts and policymakers: Is China a rising superpower? Will it someday displace the United States as the world's most powerful country? Will the U.S. and China go to war? In short, the answer could be hard to predict. A 2019 Pew Research Center Global Attitudes survey found 50% of Americans felt China's growing economy was a 'good thing' for the U.S. economy [1]. Similarly, in a Gallup World Affairs survey conducted in February this year, over 40% of Americans reported feeling positive toward China, saying that they have a favorable opinion of China [2]. During his press briefing in March 2018, Chinese Foreign Minister Wang Yi shared that China has no intention of displacing the U.S. in terms of its global role, stressing that any competition between the two sides should be

healthy and positive, and they should strive to be partners instead of rivals [3]. In July this year, the Chinese government approved exemptions for domestic companies to purchase tonnes of U.S. cotton, corn, and pork as a gesture of goodwill [4]. The Office of the U.S. Trade Representative (USTR) recently announced that a 10% tariff delay on US\$300 billion worth of Chinese imports such as furniture, computers, and clothes that would set to take effect this September [5]. With both countries having similar land areas of approximately 9.1 million square kilometers, China now has the second largest military budget in the world behind the U.S. Since coming to power in 2012, Chinese President Xi Jinping has placed his People's Liberation Army high on his national agenda, increasing military investments by 8.1% to \$174 billion in 2018 [6]. Though demonstrating its advanced capabilities to reach certain U.S. and allied military targets in the Pacific Ocean, this does not necessarily mean that China intends to attack these targets. Last year, an U.S. Department of Defense report to the Congress similarly stated that China "has thus far not been clear what messages such flights (of fighter jets) communicate beyond a demonstration of improved capabilities" [7]. Presently, there are fewer power vacuums to fill and less geographical space for China's global interests to expand into. Though demonstrating its continued efforts to become a global player in new and advanced industries, the future prospects and opportunities of China's ongoing plans like 'Made in China 2025', and large-scale infrastructure projects involving the construction of high-speed railways undertaken in the 'Belt and Road Initiative' (BRI) and Asian Infrastructure Investment Bank (AIIB), seem indefinite [8]. Policymakers of both countries should continue to identify ways that help maintain and improve overall bilateral ties.

[1] Silver, L., Delvin, K., & Huang, C. (13 August 2019). *Spring 2019 Global Attitudes Survey*. Pew Research Center.

[2] McCarthy, J. (11 March 2019). *World Affairs poll*. Gallup [online].

[3] Gao, C. (8 March 2018). Despite its global expansion, China stresses no intention to displace US. *The Diplomat* [online].

[4] Bloomberg News. (24 July 2019). *China Approves Tariff-Free U.S. Soybean Purchases as Goodwill*. Available from: <https://www.bloomberg.com/news/articles/2019-07-24/china-approves-tariff-free-u-s-soybean-purchases-as-goodwill>

[5] The Straits Times. (17 August 2019). *US removes some Chinese furniture, modems from planned 10% tariffs*. Available from: <https://www.straitstimes.com/world/united-states/us-removes-some-chinese-furniture-modems-from-planned-10-per-cent-tariffs>

[6] Brennan, D. (20 August 2019). *China's military technology now close to parity with U.S., report warns*. *Newsweek* [online]. Available from: <https://www.newsweek.com/china-military-technology-parity-us-report-research-investment-pentagon-1442565>

[7] Office of the Secretary of Defense. (16 May 2018). *Annual report to the Congress. Military and security developments involving the People's Republic of China 2018*. Available from:

https://media.defense.gov/2019/May/02/2002127082/-1/-1/1/2019_CHINA_MILITARY_POWER_REPORT.pdf

[8] Cai, P. (22 March 2017). *Understanding China's Belt and Road initiative*. Lowy Institute. Available from:

<https://www.lowyinstitute.org/publications/understanding-belt-and-road-initiative>

Q12 Anticipations of outgroup hostility scale

Next, we would like to know your opinion about the relationship between U.S. and China. Please answer the following questions and indicate your response on the scale provided.

1. How hateful is China towards America?
2. How harmful is China to America?
3. How serious of a threat is China to America?

Q13 Intragroup context vignette (Manipulation task)

We would like you to read some excerpts of opinion articles regarding current pollution levels in the United States.

Air and water quality have been long-standing concerns in the U.S. Over the past four decades, the quality of air and fresh water has improved, mainly in response to evidence-based policy decisions, federal regulations, and technology management implemented nearly a half century ago [1]. Improvements via these initiatives over the period 1970 to 1990 provided the U.S. an estimated \$22 trillion in cumulative human health benefits. Projected economic benefits could extend into preventing about 230,000 cases of premature morbidity and mortality through cancer, cardiovascular diseases, and other diagnoses in 2020 [2]. From 1970 to 2017, aggregate national emissions of the six common pollutants such as carbon monoxide, nitrogen dioxide and sulfur dioxide dropped an average of 73% as gross domestic product which involves worker productivity grew by 324% [3]. Greenhouse gas and fuel economy standards for passenger vehicles, and new generations of cleaner, more fuel-efficient trucks will save an estimated \$1.7 trillion for consumers and businesses and cut America's oil consumption by 12 billion barrels [4]. Though America's air is much cleaner than it used to be, recent environmental data suggests that smog and particulate matter levels are ticking back up [5]. Emissions and deposition of ammonia derived largely from agriculture and motor vehicles are generally increasing and are not regulated in the U.S. [6]. Soil areas that historically received air- and waterborne high sulfur and nitrogen depositions are being depleted of calcium and other important nutrients, affecting the health and regeneration of plant cultivations

like sugar maple. Continued hazardous mineral deposition may continue to constrain the recovery of soil base nutrient status and tree growth [7]. Although the Environmental Protection Agency have set limits to residual emissions from coal productions, many power plants do not have the necessary pollution controls installed. The future impacts and effects of these legal requirements remain uncertain. Forecasting models and projections developed by climate scientists and geological researchers indicate that the reasons for the recent fluctuations in air and water quality in the U.S. remain unclear but may be related to high numbers of wildfires, a warming climate, and increasing human consumption patterns driven by population growth and a strong economy. Consequently, the long-term outlook, direct and indirect effects of pollution levels for the country thus also remain unclear [8].

- [1] Sullivan, T. J., Driscoll, C. T., Beier, C. M., Burtraw, D., Fernandez, I. J., Galloway, J. N., ... & Watmough, S. A. (2018). Air pollution success stories in the United States: The value of long-term observations. *Environmental science & policy*, 84, 69-73.
- [2] Resources for the Future. (15 March 2018). Air Pollution Success Stories in the United States: the Value of Long-Term Observations.
- [3] United States Environmental Protection Agency. (2019). For more than forty-five years the Clean Air Act has cut pollution as the U.S. economy has grown. Progress Cleaning the Air and Improving People's Health. Available from: <https://www.epa.gov/clean-air-act-overview/progress-cleaning-air-and-improving-peoples-health>
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- [5] Popovich, N. (19 June 2019). America's skies have gotten clearer, but millions still breathe unhealthy Air. *The New York Times* [online].
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- [7] United States Environmental Protection Agency. (2019). Advances in Critical Load Science and the Impacts From Nitrogen Deposition and Climate Change on Forest Biodiversity and Ecosystem Services
- [8] Union of Concerned Scientists. (2019). Coal's impacts include air and water pollution, worker deaths, and climate change.

Q14 Manipulation check for vignette

Please read the statements and indicate your opinion for each statement on the scales provided.

1. How difficult is the article to understand?
2. How credible do you feel the article is?
3. How persuasive do you feel the article is?

Q15 Manipulation check for vignette

What is the central theme of the article that you just read about?

Q16 Anticipations of threat to U.S.

Next, we would like to know your opinions about current pollution issues in the U.S.

Please answer the following questions and indicate your response on the scale provided.

1. How harmful are current pollution issues to America?
2. How serious of a threat are current pollution issues in America?

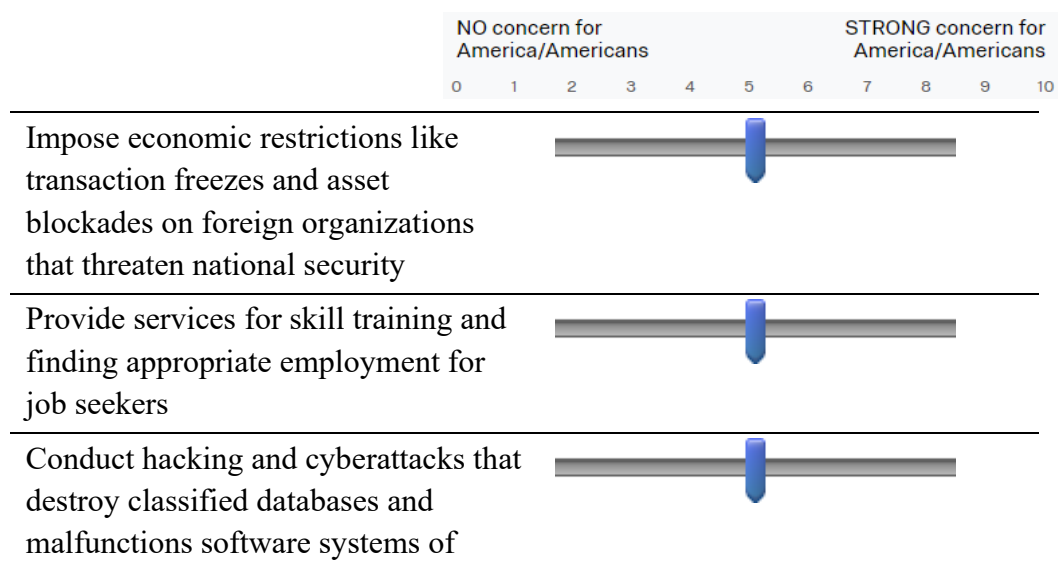
Q17 Appraisal for support for policy program categories

Suppose that the government has additional funds collected from U.S. taxpayers that could be applied to different programs and policies.

Please indicate how much concern, compassion, and empathy for the welfare of America/Americans is represented in each of the programs/policies described below.

You may click and drag the slider to respond to each program/policy according to the following scale (NO concern for America/Americans = 1, STRONG concern for America/Americans = 10)

How much concern, compassion, and empathy for the welfare of America/Americans is represented in each of the programs/policies?



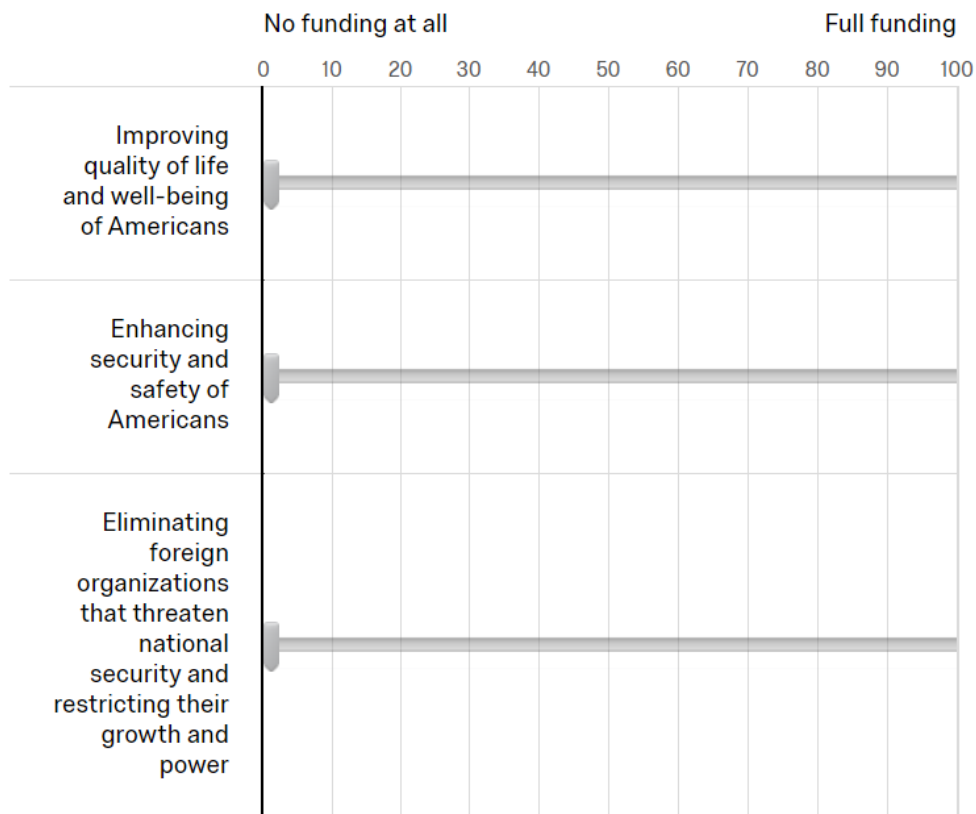
foreign organizations that threaten national security	
Increase security measures at highly crowded events and public places	
Strengthen law enforcement agencies (manpower, equipment, technology)	
Support programs to improve affordability and quality of healthcare	
Administer aggressive interrogation techniques on members of foreign organizations that threaten national security	
Arrest immediate family of members from foreign organizations that threaten national security under indefinite detention	
Increase preparedness and effectiveness of emergency response services	
Strengthen border security (manpower, equipment, technology)	
Improve quality of public schools	
Engage military and missile attacks to contain foreign organizations that threaten national security	
Provide financial aid to low-income families	

Q20 Suppose that the government has limited funding that could be applied to one of the following types of programs/policies.

Please indicate what percentage of these funds should be allocated to each of the objectives described below.

Please make sure the amount of funding allocated to the programs/policies add up to 100%.

What percentage of these limited funds should be allocated to each of the objectives?



Q21 Vengeance scale

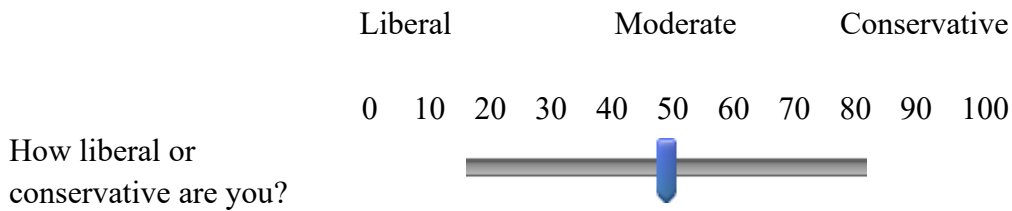
Please read each statement and indicate your level of agreement on the scale provided.

1. It is important for me to get back at people who have hurt me.
2. I try to even the score with anyone who hurts me.
3. I live by the motto 'let bygones be bygones'.
4. There is nothing wrong in getting back at someone who has hurt you.
5. I believe in the motto 'an eye for an eye; a tooth for a tooth'.
6. I find it easy to forgive those who hurt me.
7. If someone causes me trouble, I'll find a way to make them regret it.
8. If I'm wronged, I can't live with myself unless I get revenge.
9. Revenge is sweet.
10. Honour requires that you get back at someone who has hurt you.
11. Anyone who provokes me deserves the punishment that I give them.

- 12. People who insist on getting revenge are disgusting.
- 13. It's not worth my time or effort to pay back someone who has wronged me.
- 14. It is always better not to seek vengeance.
- 15. I don't just get mad, I get even.
- 16. I am not a vengeful person.
- 17. Revenge is morally wrong.
- 18. To have a desire for vengeance would make me feel ashamed.
- 19. It is usually better to show mercy than to take revenge.
- 20. It is always better to "turn the other cheek."

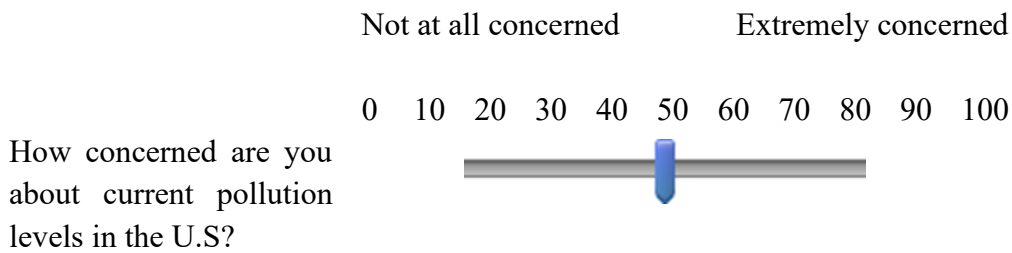
Q22 Manipulation check

On a scale from liberal to conservative (where 0 means liberal and 100 means conservative), how liberal or conservative are you?



Q23 Manipulation check

We would like to know how concerned are you about pollution levels in the U.S. Please provide a number from 0 to 100 where 0 represents not concerned at all and 100 represents extremely concerned. If you didn't feel particularly concerned toward the pollution levels, you could rate it at the 50-degree mark. You may click and drag the slider to indicate your response.



Q24 Manipulation check

Generally, how supportive are you of pro-environmental groups and activities? (*Strongly oppose* = 1, *Strongly support* = 7)

We request that you do not share this information with others, since prior knowledge about this aspect of our experiment may adversely affect from future participants.

If you choose to withdraw your data from the study based on the information provided on this debriefing, you may do so. You will still receive your compensation for participating in the study even if you choose to withdraw your data.

In addition, please feel free to contact Dr. Bobby Cheon (bkcheon@ntu.edu.sg) if you have any questions or concerns about the study. You may also contact the Nanyang Technological University Institutional Review Board (IRB) regarding your rights as a participant in the study (IRB@ntu.edu.sg).

Once again, we thank you for your participation in this experiment.

Confirmation of understanding of the debriefing and consent for data to be used in the study:

I confirm that I have read and understood the content of this debriefing statement, and that I am aware that some procedures and information provided to me during this experiment was artificial with the intention of eliciting feelings of threat or insecurity, especially towards other groups of people. I acknowledge that I am not experiencing any significant negative feelings as a result of the questions or procedures I have completed during this experiment, and that I agree to have my responses and data be maintained and analyzed for this study.

- I AGREE with the statement above
- I DISAGREE with the statement above. Please do not include my data in this study (you will still receive reimbursement for completing the survey)

Q34 Comments

If you experience significant negative feelings or distress associated with the questions or measures you completed during this study, please contact the principal investigator: Assistant Professor Bobby Cheon (bkcheon@ntu.edu.sg). Thank you for your participation.

Appendix G: Serial mediational analyses

Regression coefficients of mediational analyses with appraisals of ingroup benefit policies predicting forced-choice policy support categories in the intergroup context

	B	S.E	<i>t</i>	95% C.I.
Mediator variable models				
Readiness to self-sacrifice				
Constant	.75**	.25	3.01	.26, 1.25
Identity fusion	.72***	.06	12.00	.61, .84
Familiarity with				
current developments	-.02	.04	-.40	-.10, .07
in China (covariate)				
Readiness to self-				
sacrifice conditions	.06	.14	.43	-.22, .34
(covariate)				
$F(3, 187) = 47.99***$				
$R^2 = .44$				
	B	S.E	<i>t</i>	95% C.I.
Anticipations of outgroup hostility				
Constant	2.68***	.32	8.33	2.04, 3.31
Identity fusion	.04	.10	.39	-.16, .24

Readiness to self-sacrifice	.19*	.09	2.05	.004, .37
Familiarity with current developments in China (covariate)	.10	.06	1.80	-.01, .21
Readiness to self-sacrifice conditions (covariate)	-.16	.18	-.92	-.51, .19
$F(4, 186) = 3.40^{**}$				
$R^2 = .07$				
Appraisal of ingroup benefit policies				
Constant	8.67***	.74	11.70	7.20, 10.13
Identity fusion	-.17	.20	-.93	-.56, .22
Readiness to self-sacrifice	-.06	.18	-.30	-.42, .30
Anticipations of outgroup hostility	-.09	.14	-.63	-.37, .19
Familiarity with current developments in China (covariate)	-.003	.11	-.03	-.22, .21
Readiness to self-sacrifice conditions (covariate)	.42	.35	1.20	-.27, 1.11
$F(5, 185) = .92$				

$R^2 = .02$				
	B	S.E	<i>t</i>	95% C.I.
Dependent variable models				
(1) Forced-choice support for the ingroup benefit policies				
Constant	51.07***	7.88	6.48	33.52, 66.62
Identity fusion	-4.42***	1.60	-2.77	-7.57, -1.27
Readiness to self-sacrifice	-3.04*	1.47	-2.07	-5.94, -.14
Anticipations of outgroup hostility	.06	1.16	.05	-2.23, 2.36
Appraisal of ingroup benefit policies	3.00***	.59	5.05	1.83, 4.17
Familiarity with current developments in China (covariate)	1.08	.89	1.21	-.68, 2.83
Readiness to self-sacrifice conditions (covariate)	-1.95	2.83	-.69	-7.54, 3.64
$F(6, 184) = 11.37***$				
$R^2 = .27$				
	B	S.E	<i>t</i>	95% C.I.
(2) Forced-choice support for ingroup defence policies				
Constant	37.46***	5.83	6.42	25.95, 48.96

Identity fusion	2.73*	1.18	2.31	.40, 5.06
Readiness to self-sacrifice	-.05	1.09	-.05	-2.20, 2.09
Anticipations of outgroup hostility	-.88	.86	-1.02	-2.58, .82
Appraisal of ingroup benefit policies	-1.64**	.44	-3.74	-2.58, -.78
Familiarity with current developments in China (covariate)	-.93	.66	-1.42	-2.23, .36
Readiness to self-sacrifice conditions (covariate)	2.03	2.10	.97	-2.10, 6.17
$F(6, 184) = 4.58^{**}$				
$R^2 = .13$				
	B	S.E	<i>t</i>	95% C.I.
(3) Forced-choice support for outgroup harm policies				
Constant	11.47*	5.33	2.15	.94, 21.99
Identity fusion	1.69	1.08	1.56	-.44, 3.82
Readiness to self-sacrifice	3.10*	1.00	3.11	1.13, 5.06
Anticipations of outgroup hostility	.82	.79	1.04	-.73, 2.37

Appraisal of ingroup benefit policies	-1.35**	.40	-3.37	-2.15, -.56
Familiarity with current developments in China (covariate)	-.14	.60	-.23	-1.33, 1.04
Readiness to self-sacrifice conditions (covariate)	-.08	1.92	-.04	-3.86, 3.70
$F(6, 184) = 8.98***$				
$R^2 = .23$				

* $p \leq .05$, ** $p \leq .01$, *** $p \leq .001$.

Appendix H: Serial mediational analyses

Regression coefficients of mediational analyses with appraisals of ingroup defence policies predicting forced-choice policy support categories in the intergroup context

	B	S.E	<i>t</i>	95% C.I.
Mediator variable models				
Appraisal of ingroup defence policies				
Constant	4.81***	.59	8.19	3.65, 5.97
Identity fusion	.57**	.16	3.61	.25, .87
Readiness to self-sacrifice	.03	.14	.21	-.25, .32
Anticipations of outgroup hostility	.04	.11	.33	-.19, .26
Familiarity with current developments in China (covariate)	-.15	.09	-1.67	-.32, .03
Readiness to self-sacrifice conditions (covariate)	.06	.28	.21	-.49, .61
$F(5, 185) = 5.47^{**}$				
$R^2 = .13$				
	B	S.E	<i>t</i>	95% C.I.

Dependent variable models				
(1) Forced-choice support for ingroup benefit policy				
Constant	96.13***	6.92	13.89	82.48, 109.79
Identity fusion	-2.67	1.64	-1.63	-5.90, .56
Readiness to self-sacrifice	-3.11*	1.46	-2.31	-6.00, -.23
Anticipations of outgroup hostility	-.02	1.15	-.02	-2.30, 2.26
Appraisal of ingroup defence policies	-3.97***	.74	-5.35	-5.43, -2.50
Familiarity with current developments in China (covariate)	.49	.89	.54	-1.27, 2.24
Readiness to self-sacrifice conditions (covariate)	-.47	2.80	-.17	-6.00, 5.06
$F(6, 184) = 11.99***$				
$R^2 = .28$				
	B	S.E	<i>t</i>	95% C.I.
(2) Forced-choice support for ingroup defence policies				
Constant	14.54*	5.20	2.79	4.27, 24.81

Identity fusion	1.98	1.23	1.61	-.45, 4.41
Readiness to self-sacrifice	-.004	1.10	-.004	-2.17, 2.16
Anticipations of outgroup hostility	-.82	.86	-.95	-2.53, .89
Appraisal of ingroup defence policies	1.80*	.56	3.24	.70, 2.91
Familiarity with current developments in China (covariate)	-.67	.67	-1.00	-1.98, .65
Readiness to self-sacrifice conditions (covariate)	1.24	2.11	.59	-2.92, 5.40
$F(6, 184) = 3.95^{**}$				
$R^2 = .11$				
	B	S.E	<i>t</i>	95% C.I.
(3) Forced-choice support for outgroup harm policies				
Constant	-10.68*	4.63	-2.31	-19.81, -1.55
Identity fusion	.69	1.09	.63	-1.47, 2.85
Readiness to self-sacrifice	3.12*	.98	3.19	1.19, 5.04

Anticipations of outgroup hostility	.84	.77	1.09	-.68, 2.37
Appraisal of ingroup defence policies	2.16***	.50	4.36	1.18, 3.14
Familiarity with current developments in China (covariate)	.18	.59	.30	-.99, 1.35
Readiness to self- sacrifice conditions (covariate)	-.77	1.87	-.41	-4.41, 2.92
$F(6, 184) = 10.53***$				
$R^2 = .26$				

* $p \leq .05$, ** $p \leq .01$, *** $p \leq .001$.

Appendix I: Serial mediational analyses

Regression coefficients of mediational analyses with appraisals of ingroup benefit policies predicting forced-choice support policy categories in the intragroup context

	B	S.E	<i>t</i>	95% C.I.
Mediator variable models				
Readiness to self-sacrifice				
Constant	1.06**	.38	2.80	.31, 1.80
Identity fusion	.71***	.06	12.13	.60, .82
Support towards pro-environmental groups and activities in the U.S. (covariate)				
Readiness to self- sacrifice conditions (covariate)	-.07	.05	-1.30	-.18, .04
$F(3, 181) = 51.98***$				
$R^2 = .46$				
Anticipations of harm to the U.S.				
Constant	2.48***	.39	6.44	1.72, 3.23
Identity fusion	-.20*	.08	-2.48	-.35, -.04

Readiness to self-sacrifice	.12	.14	1.57	-.03, .26
Support towards pro-environmental groups and activities in the U.S. (covariate)	.62***	.05	11.65	.52, .74
Readiness to self-sacrifice conditions (covariate)	-.06	.14	-.43	-.33, .21
$F(4, 180) = 36.86***$				
$R^2 = .45$				
	B	S.E	<i>t</i>	95% C.I.
Appraisal of ingroup benefit policies				
Constant	5.34***	.90	5.92	3.56, 7.12
Identity fusion	.11	.17	.64	-.23, .44
Readiness to self-sacrifice	-.26	.16	-1.64	-.57 .05
Anticipations of harm to the U.S.	.27	.16	1.71	-.04, .58
Support towards pro-environmental groups and activities	.27	.15	1.81	-.03, .57

in the U.S.				
(covariate)				
Readiness to self-				
sacrifice conditions	-.25	.29	-.87	-.83, .32
(covariate)				
$F(5, 179) = 4.77^{***}$				
$R^2 = .12$				
Dependent variable models				
	B	S.E	<i>t</i>	95% C.I.
(1) Forced-choice support for ingroup benefit policies				
Constant	28.60**	9.29	3.08	10.27, 46.93
Identity fusion	-6.28**	1.60	-3.93	-9.43, -3.12
Readiness to self-				
sacrifice	-1.19	1.50	-.80	-4.14, 1.76
Anticipations of				
harm to the U.S.	4.10***	.70	5.83	2.71, 5.49
Appraisal of ingroup				
benefit policies	4.10***	.70	5.83	2.71, 5.49
Support towards				
pro-environmental				
groups and activities	4.54*	1.44	3.16	1.71, 7.38
in the U.S.				
(covariate)				

Readiness to self-				
sacrifice conditions	-.87	2.76	-.31	-6.32, 4.58
(covariate)				
$F(6, 178) = 19.05^{***}$				
$R^2 = .39$				
	B	S.E	<i>t</i>	95% C.I.
(2) Forced-choice support for ingroup defence policies				
Constant	32.30***	6.75	4.78	18.98, 45.62
Identity fusion	3.25*	1.16	2.80	.96, 5.55
Readiness to self-				
sacrifice	.98	1.09	.90	-1.16, 3.12
Anticipations of				
threat to the U.S.	2.09	1.09	1.92	-.06, 4.23
Appraisal of				
ingroup benefit	-2.17***	.51	-4.24	-3.18, -1.16
policies				
Support towards				
pro-environmental				
groups and	-2.37*	1.05	-2.27	-4.44, -.31
activities in the				
U.S. (covariate)				
Readiness to self-				
sacrifice conditions	2.34	2.01	1.16	-1.63, 6.30
(covariate)				

$F(6, 178) = 9.79^{***}$				
$R^2 = .25$				
	B	S.E	<i>t</i>	95% C.I.
(3) Forced-choice support for outgroup harm policies				
Constant	39.10***	5.62	6.96	28.01, 50.20
Identity fusion	3.02*	.97	3.13	1.11, 4.93
Readiness to self-sacrifice	.21	.90	.23	-1.57, 1.99
Anticipations of harm to the U.S.	-.52	.91	-.58	-2.31, 1.26
Appraisal of ingroup benefit policies	-1.93***	.43	-4.55	-2.77, -1.09
Support towards pro-environmental groups and activities in the U.S. (covariate)	-2.17*	.87	-2.49	-3.89, -.45
Readiness to self-sacrifice conditions (covariate)	-1.47	1.67	-.88	-.48, 1.84
$F(6, 178) = 13.50^{***}$				
$R^2 = .31$				

* $p \leq .05$, ** $p \leq .01$, *** $p \leq .001$.

Appendix J: Serial mediational analyses

Regression coefficients of mediational analyses with appraisals of ingroup defence policies predicting forced-choice policy support categories in the intragroup context

	B	S.E	<i>t</i>	95% C.I.
Mediator models				
Appraisal of ingroup defence policies				
Constant	4.43***	.86	5.17	2.74, 6.12
Identity fusion	.61**	.16	3.80	.29, .93
Readiness to self-sacrifice	.06	.15	.39	-.24, .35
Anticipations of harm to the U.S.	.12	.15	.80	-.18, .41
Support towards pro-environmental groups and activities in the U.S. (covariate)	-.24	.14	-1.64	-.52, .05
Readiness to self-sacrifice conditions (covariate)	.13	.28	.48	-.42, .68
$F(5, 179) = 7.32***$				
$R^2 = .17$				

	B	S.E	<i>t</i>	95% C.I.
Dependent variable models				
(1) Forced-choice support for ingroup benefit policies				
Constant	57.45***	9.83	5.84	38.04, 76.85
Identity fusion	-4.88*	1.79	-2.72	-8.42, -1.34
Readiness to self-sacrifice	-2.16	1.61	-.17	-3.44, 2.90
Anticipations of harm to the U.S.	-.27	1.61	-.17	-3.44, 2.90
Appraisal of ingroup defence policies	-1.57*	.80	-1.95	-3.14, .02
Support towards pro-environmental groups and activities in the U.S. (covariate)	5.30**	1.55	3.42	2.24, 8.36
Readiness to self-sacrifice conditions (covariate)	-1.70	2.98	-.57	-7.58, 4.18
$F(6, 178) = 12.11***$				
$R^2 = .29$				
	B	S.E	<i>t</i>	95% C.I.

(2) Forced-choice support for ingroup defence policies				
	B	S.E	<i>t</i>	95% C.I.
Constant	17.47*	6.91	2.53	3.83, 31.12
Identity fusion	2.57*	1.26	2.04	.09, 5.06
Readiness to self-sacrifice	1.50	1.13	1.33	-.72, 3.72
Anticipations of harm to the U.S.	1.42	1.13	1.25	-.81, 3.64
Appraisal of ingroup defence policies	.73	.56	1.30	-.38, 1.84
Support towards pro-environmental groups and activities in the U.S. (covariate)	-2.79*	1.09	-2.56	-4.94, -.64
Readiness to self-sacrifice conditions (covariate)	2.79	2.10	1.33	-1.35, 6.92
$F(6, 178) = 6.51^{***}$				
$R^2 = .18$				
	B	S.E	<i>t</i>	95% C.I.
(3) Forced-choice support for outgroup harm policies				
Constant	25.07***	5.77	4.43	13.69, 36.47

Identity fusion	2.31*	1.05	2.19	.23, 4.38
Readiness to self-sacrifice	.66	.94	.70	-1.19, 2.52
Anticipations of harm to the U.S.	-1.14	.94	-1.21	-3.00, .72
Appraisal of ingroup defence policies	.83	.47	1.77	-.10, 1.76
Support towards pro-environmental groups and activities in the U.S. (covariate)	-2.50*	.91	-2.75	-4.30, .71
Readiness to self-sacrifice conditions (covariate)	-1.09	1.75	-.62	-4.54, 2.37
$F(6, 178) = 9.69^{***}$				
$R^2 = .25$				

* $p \leq .05$, ** $p \leq .01$, *** $p \leq .001$.

Appendix K: Serial mediational analyses

Regression coefficients of mediational analyses with appraisals of outgroup harm policies predicting forced-choice policy support categories in the intragroup context

	B	S.E	<i>t</i>	95% C.I.
Appraisal of outgroup harm policies				
Constant	2.38**	.89	2.70	.64, 4.13
Identity fusion	.71***	.17	4.25	.38, 1.04
Readiness to self-sacrifice	.14	.15	.89	-.17, .44
Anticipations of harm to the U.S.	.03	.15	.20	-.27, .34
Support towards pro-environmental groups and activities in the U.S. (covariate)	-.23	.15	-1.56	-.52, .06
Readiness to self-sacrifice conditions (covariate)	.46	.29	1.62	-.10, 1.03
$F(5, 179) = 11.58***$				
$R^2 = .24$				
	B	S.E	<i>t</i>	95% C.I.

Dependent variable models				
(1) Forced-choice support for ingroup benefit policies				
Constant	55.08***	9.30	5.93	36.74, 73.43
Identity fusion	-4.48*	1.80	-2.50	-8.03, -.94
Readiness to self-sacrifice	-1.99	1.60	-1.25	-5.14, 1.16
Anticipations of harm to the U.S.	-.40	1.59	-1.25	-5.14, 1.16
Appraisal of outgroup harm policies	-1.91*	.77	-2.48	-3.43, -.39
Support towards pro-environmental groups and activities in the U.S. (covariate)	5.22**	1.54	3.39	2.19, 8.26
Readiness to self-sacrifice conditions (covariate)	-1.02	2.98	-.34	-6.91, 4.86
$F(6, 178) = 12.65***$				
$R^2 = .30$				
	B	S.E	<i>t</i>	95% C.I.
(2) Forced-choice support for ingroup defence policies				

Constant	20.00*	6.60	3.03	6.97, 33.03
Identity fusion	2.81*	1.28	2.20	.29, 5.33
Readiness to self-sacrifice	1.50	1.13	1.32	-.74, 3.74
Anticipations of harm to the U.S.	1.49	1.13	1.32	-.74, 3.73
Appraisal of outgroup harm policies	.30	.55	.55	-.78, 1.38
Support towards pro-environmental groups and activities in the U.S. (covariate)	-2.90*	1.09	-2.65	-5.05, -.74
Readiness to self-sacrifice conditions (covariate)	2.75	2.12	1.30	-1.43, 6.92
$F(6, 178) = 6.23^{***}$				
$R^2 = .17$				
	B	S.E	<i>t</i>	95% C.I.
(3) Forced-choice support for outgroup harm policies				
Constant	24.92***	5.34	4.66	14.37, 35.47
Identity fusion	1.68	1.03	1.62	-.36, 3.71

Readiness to self-sacrifice	.49	.92	.53	-1.32, 2.30
Anticipations of harm to the U.S.	-1.09	.92	-1.19	-2.90, .71
Appraisal of outgroup harm policies	1.61**	.44	3.64	.74, 2.48
Support towards pro-environmental groups and activities in the U.S. (covariate)	-2.33*	.89	-2.63	-4.07, -.58
Readiness to self-sacrifice conditions (covariate)	-1.72	1.71	-1.01	-5.10, 1.66
$F(6, 178) = 11.89***$				
$R^2 = .29$				

* $p \leq .05$, ** $p \leq .01$, *** $p \leq .001$.

Appendix L: Pre-registration document for Study 6

Data collection. Have any data been collected for this study already?

Please choose. Note: 'Yes' is a discouraged answer for this preregistration form.
(optional)

It's complicated. We have already collected some data but explain in Question 8 why readers may consider this a valid pre-registration nevertheless.

Hypothesis. What's the main question being asked or hypothesis being tested in this study? (optional)

We primarily seek to investigate whether participants who are reminded of the distinctions among different ingroup memberships that they are committed to (which will be the experimental condition involving social identity complexity; high SIC) may report weaker support for aggressive and restrictive policies targeting an outgroup, compared to participants who are asked to indicate the overlaps between ingroups they belong to (low social identity complexity; low SIC).

We hypothesize a moderated serial mediational pathway, in which high SIC would predict weaker support for restrictive policies on outgroup aggression, through low readiness for self-sacrifice and weaker anticipations of outgroup hostility. The relationship between readiness for self-sacrifice and anticipations of outgroup hostility is predicted to be moderated by vengeance.

Dependent variable. Describe the key dependent variable(s) specifying how they will be measured. (optional)

The key dependent variables are the level of support for three policy programs toward American well-being (ingroup benefit), security for Americans (ingroup defense), and restrictions toward a domestic, ultraconservative religious organization (outgroup aggression). Participants are asked to state how supportive are they of three policy measures pertaining to ingroup benefit, ingroup defense, and outgroup aggression. Participants will be asked a forced-choice item which involve the three specific policy programs and the level of support should collectively amount to 100%. The allotments will be measured using Qualtrics.

Conditions. How many and which conditions will participants be assigned to? (optional)

This study follows a between-subjects design that will consist of two conditions of social identity complexity (High vs Low). Employing the social identity complexity manipulation by Grant and Hogg (2012), participants in the low SIC group will be asked to list four social identities that they think are important to them and to describe the extent to which members in the groups overlap with members in another group. Participants in the high SIC group will be asked to

list four social identities that they think are important to them and to describe the extent to which members in the groups are distinct and different from members in another group.

Analyses. Specify exactly which analyses you will conduct to examine the main question/hypothesis. (optional)

Readiness for self-sacrifice will be measured using a 10-item scale by Bélanger et al. (2014) and will be adapted to the American identity. Vengeance will be measured using 20-item scale by Stuckless and Goranson (1992). Anticipations of outgroup hostility will be measured by participants' expectations of potential aggression/harm intended from the outgroup.

Moderated mediational models will be employed to test the hypothesis. The independent variable will be the SIC conditions and the dependent variable(s) will be support for policies relating to outgroup aggression. The first mediator will be readiness for self-sacrifice, and the second mediator will be anticipations of outgroup hostility. The moderator would be the vengeance variable.

Outliers and Exclusions. Describe exactly how outliers will be defined and handled, and your precise rule(s) for excluding observations. (optional)

Participants with missing data and those whose nationality is not 'USA' will be excluded. Participants may also be excluded if their responses on free-response questions are irrelevant to the question or reflect misunderstanding of what the question is asking.

Sample Size. How many observations will be collected or what will determine sample size? No need to justify decision, but be precise about exactly how the number will be determined. (optional)

A total of 200 participants will be recruited, with 100 participants in each condition.

Other. Anything else you would like to pre-register? (e.g., secondary analyses, variables collected for exploratory purposes, unusual analyses planned?) (optional)

To test for main effects of SIC, one-way ANOVAs will be used to compare differences in support for forced-choice policies and policies relating to ingroup benefit, ingroup defense, and outgroup aggression between the two conditions. At the time of submitting this pre-registration, the data has been collected (data collection completed one day prior through an online survey platform). But no analyses have been conducted.

Additionally, the researcher submitting this pre-registration (lab PI) is not the same person who will be conducting initial analyses of the data (graduate student).

Name. Give a title for this AsPredicted pre-registration. Suggestion: use the name of the project, followed by study description. (optional)

Social Identity Complexity and Support for Intergroup Aggression

Finally. For record keeping purposes, please tell us the type of study you are pre-registering. (optional)

Experiment

Other (optional)

Appendix M: Survey questionnaire for Study 6

Q1 Study Information sheet

Name of PI: Dr. Bobby Cheon

Institution and contact details: School of Humanities and Social Sciences,
Nanyang Technological University and bkcheon@ntu.edu.sg

IRB reference number: IRB-2015-09-023-04

Title of Study: Contextual influences on Decision-making in Group Contexts
Study

Objective: The aim of this study is to examine how individuals' perception and interpretation of social situations influence their decisions in social contexts

Procedures: During this study you may be asked to:

- Complete social decision-making tasks in which you make choices that affect your own outcomes, as well as the outcomes of other participants. Decisions involve choices such as allocation of resources or responsibilities. Your decisions will affect outcomes such as points or credits earned in the decision-making task, which may be used to determine bonus payment that you and other participants can earn during the experiment.
- Perform a task or responsibility that may be assigned to you by one or more member/s of your group. The task or responsibility that is allocated to you or assigned by you to others may have components that are aversive or strenuous.
- You may be asked to view images, write about, manipulate, handle, and make decisions regarding different types of resources. This includes resources such as points that may be exchanged for rewards in decision-making tasks or money.
- You may be asked to view, categorize, and rate images of social scenes or faces of people that belong to different social or ethnic groups
- Complete a series of surveys regarding your attitudes, opinions, and beliefs about yourself, your relationship with others, and social issues

Right to Refuse or Withdraw: Your participation in this study is completely voluntary, and you may withdraw from the study at any time without penalty (however, you will not receive course credit for this study). You may skip over any questions or procedures that you do not wish to answer, or you may withdraw by informing the research associate that you no longer wish to participate. Your decision to participate, decline, or withdraw participation will have no effect on your status.

Risks and Discomforts: There are no anticipated risks, beyond those encountered in daily life, associated with participating in this study.

Benefits: Upon completion, you will receive an explanation of the study and the hypotheses. We also hope that you will learn a little bit about how psychological research is conducted.

Compensation: You will receive compensation for participating in this experiment consistent with the amount indicated for this study on Prolific Academic.

Anonymous and Confidential Data Collection: Data collection will be kept confidential and personally identifying information will not be stored with your data.

Confidentiality of records: All data and consent forms will be stored in a locked room or on password protected computers/storage devices. Results of this study may be presented at conferences and/or published in books, journals, and/or in the popular media.

Personal Data: Your participation in this study will remain confidential, and your identity will not be stored with your data. Your responses will be assigned a code number that is not linked to your name or other identifying information.

By signing the Consent Form attached, you (or your legally acceptable representative, if relevant) are authorizing (i) collection, access to, use and storage of your “Personal Data”, and (ii) disclosure to, and use and storage by, authorised service providers and relevant third parties, whether located in Singapore or overseas, for the purposes of the study.

“Personal Data” means data about you which makes you identifiable: (i) from such data; or (ii) from that data and other information which an organisation has or likely to have access.

Research arising in the future, based on this “Personal Data”, will be subject to review by the relevant institutional review board.

Data collected are the property of Nanyang Technological University. In the event of any publication regarding this study, your identity will remain confidential.

Research data containing your “Personal Data” will be transferred out of Singapore to collaborating research team members located abroad for the purposes described in this Consent Form. These collaborating research team members will take appropriate steps to ensure it complies with the data protection requirements in the Personal Data Protection Act while your “Personal Data” to be transferred remains in its possession or under its control.”

Who to contact with questions: If you have any enquiries concerning the study in the future, please feel free to contact Dr. Bobby Cheon (bkcheon@ntu.edu.sg) at School of Humanities and Social Sciences, Nanyang Technological University.

Should you have questions on participants' rights in the study, please contact:
NTU-Institutional Review Board
Research Integrity and Ethics Office
50 Nanyang Avenue, North Spine
NS4-05-92A
Singapore 639798
Email: irb@ntu.edu.sg

Consent Form

I have read, discussed and understand the information and procedures in the study information sheet attached to this consent form. My questions concerning the study have been answered to my satisfaction, and I acknowledge that I am participating in this study of my own free will. I understand that I may refuse to participate or stop participating at any time.

Consent to participate in the research

- I AGREE to participate in this study (this will start the study)
- I DO NOT AGREE to participate in this study (please close the browser window)

Q4 Introduction to the study

Welcome!

Thank you for taking the time to participate in this study.

During this study, you will be asked to complete two tasks.

The first task will require you to share your opinions and experiences in writing.

For the second task, you will be asked to answer a number of short surveys.

There are no wrong answers.

Please provide the responses that most accurately reflect your attitudes and opinions.

Please pay attention and read the instructions carefully before you begin.

Q5 Social identity complexity conditions (Manipulation task for Control group)

We would like you to list down four social identities that you consider important to you and are committed to.

Your identities may include domains relating to education, work/profession, and/or leisure.

Social identity 1

Social identity 2

Social identity 3

Social identity 4

Q10 Social identity complexity conditions (Manipulation task for Control group)

In this section, we are collecting opinions about your social identities.

Below, you will be asked to write a short paragraph describing *how you think your social identities overlap and are related to one another*.

Please write a short paragraph (at least 100 words) concerning this topic.

You may advance to the next page after at least 2 minutes have passed.

Q11 Social identity complexity conditions (Manipulation task for Experimental group)

We would like you to list down four social identities that you consider important to you and are committed to.

Your identities may include domains relating to education, work/profession, and/or leisure.

Social identity 1

Social identity 2

Social identity 3

Social identity 4

Q16 Social identity complexity conditions (Manipulation task for Experimental group)

In this section, we are collecting opinions about your social identities. Below, you will be asked to write a short paragraph describing *how you think your social identities are distinct and different from one another*. Please write a short paragraph (at least 100 words) concerning this topic. You may advance to the next page after at least 2 minutes have passed.

Q17 Single item on perceived overlap

How much do you feel your identities overlap?

(*Not very much* = 1, *Very much* = 9)

Q18 Readiness to self-sacrifice scale

We would like to know your level of agreement towards the following statements. Please read and respond to each statement according to the following scale from *Not agree at all* (1) to *Very strongly agree* (7).

1. It is senseless to sacrifice for America.
2. I would defend America, even if my loved ones rejected me.
3. I would be prepared to endure intense suffering if it meant defending America.
4. I would not risk my life for America.
5. There is a limit to what one can sacrifice for America.
6. My life is more important than America.
7. I would be willing to give away all my belongings to support America.
8. I would not be ready to give my life away for America.
9. I would be ready to give up all my personal possessions for America.
10. I would be ready to give my life for America.

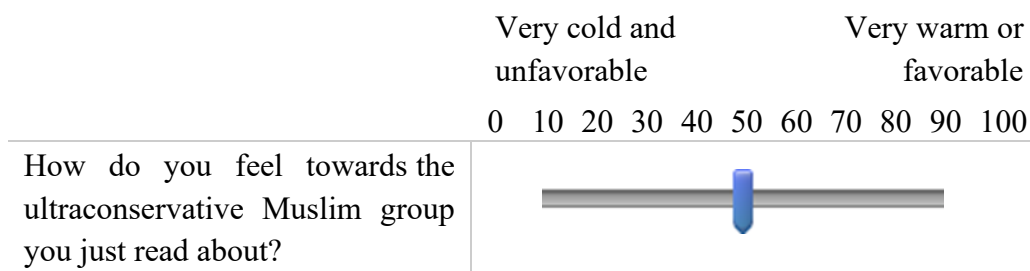
Q20 Outgroup vignette

We are interested in your opinion regarding some groups that are currently active in social and political life in the U.S.

Imagine a religious organization based in America who are ultraconservative Muslims and are advocating Islamic fundamentalist beliefs and practices. This group champions principles and values interpreted from orthodox Islamist doctrines that forbid marriages between Muslims and non-Muslims, depict pluralism and liberalism as incompatible with the Islamic civilisation and encourage the enforcement of Sharia law as the way to solve and stop problems like racism, corruption, drug abuse, homosexuality and promiscuity. The group has issued an official announcement on its website that it is not linked to or sympathizes with any domestic or international terrorist network. These claims have indeed been confirmed to be accurate based on joint investigative probes conducted by the Department of Justice, Department of Homeland Security, and the FBI. The group has been losing support from its present members, mosque organisations, and charity donors across the U.S. The group has engaged in both online and offline efforts to spread awareness of its brand of Islam and increase membership, through several outreach programs that include distribution of pamphlets and audio-visual recordings of their sermons catered for children and adults. Overall, these efforts have been largely unsuccessful. Recent events like private group discussions and talks on the historical development of Islamist theory that the group organised, have been poorly attended. The remaining members of this group are currently seeking for a better recognition of their interests in the U.S. and have planned to conduct public rallies and demonstrations which are expected to receive limited levels of interest and attendance.

Q21 Feeling thermometer scale

We would like to know what your general feelings are about the ultraconservative Muslim group you just read about. Please provide a number from 0 to 100 where 0 represents very cold or unfavorable feeling and 100 represents very warm or favorable feeling. If you didn't feel particularly warm or cold toward the group, you could rate it at the 50-degree mark. You may click and drag on the bar to indicate your response.



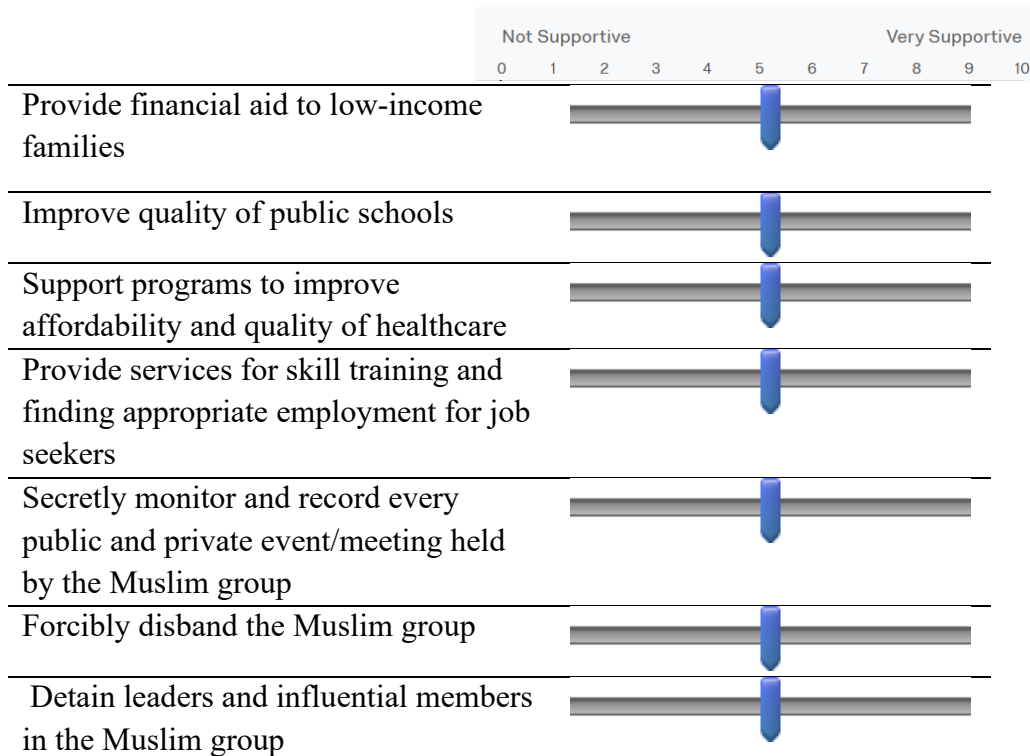
Q22 Anticipations of outgroup hostility scale

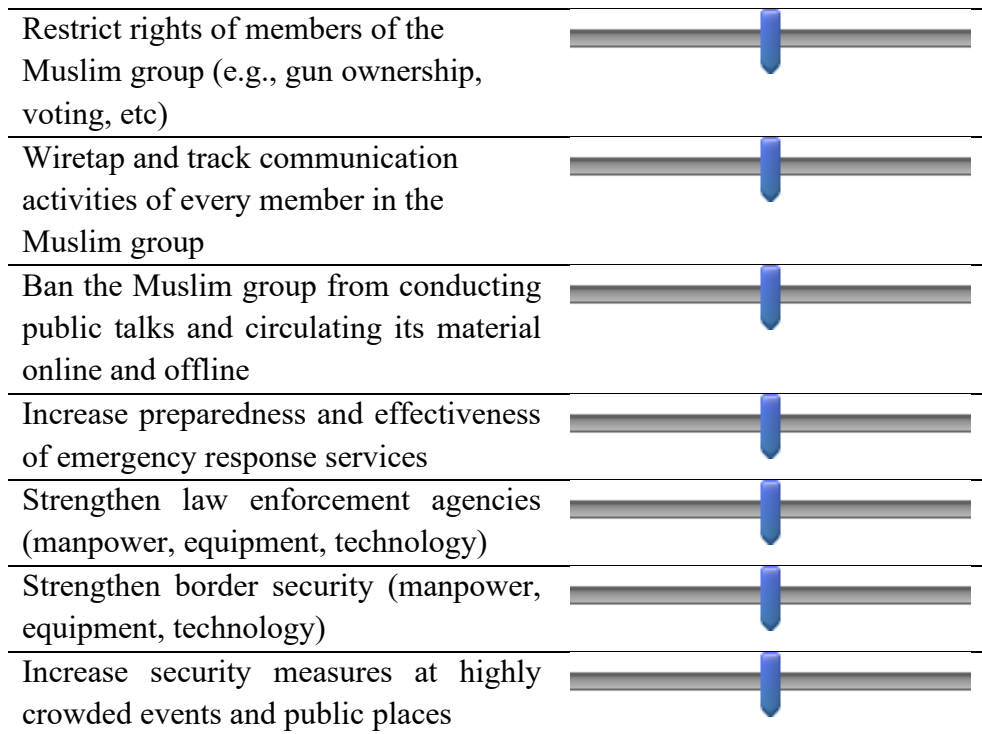
Next, we would like to know your opinions of this ultraconservative Muslim group's presence in America. Please answer the following questions and indicate your response on the scale provided.

1. How aggressive is this group to America?
2. How hateful is this group to America?
3. How friendly is this group to America?
4. How harmful is this group to America?
5. How hostile is this group to America?
6. How safe is this group to America?
7. How supportive are you of this group?
8. How sympathetic do you feel towards this group?
9. How fearful are you of this group?
10. How worried are you of this group?
11. How serious of a threat is this group to America?

Q23 Policy support scale

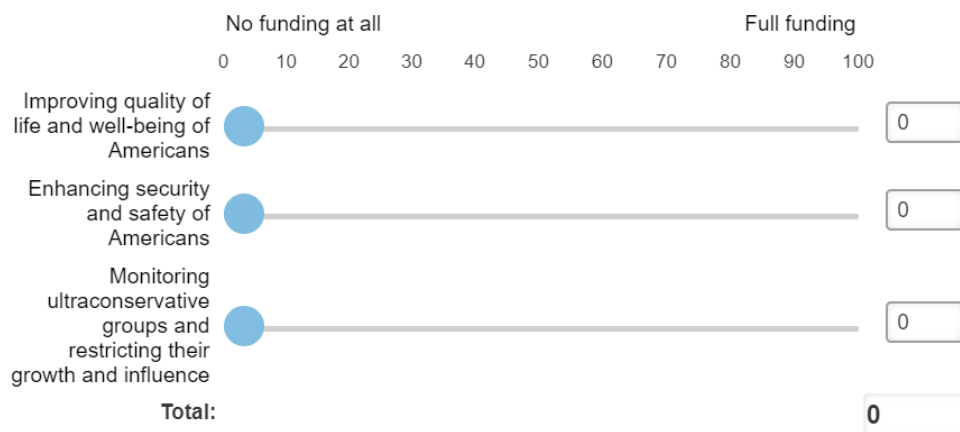
Suppose that the government has additional funds collected from U.S. taxpayers that could be applied to different programs and policies. For each of the programs/policies described below, please indicate how much you support applying the additional funds to implement them. Please assume that each program/policy will be effective in accomplishing its goals if it is funded. You may click and drag the slider to respond to each program/policy according to the following scale (*Not at all supportive* = 0, *Very supportive* = 10).





Q24. Forced choice policy support items

Suppose that the government has limited funding that could be applied to one of the following types of programs/policies. Please indicate what percentage of these funds should be allocated to each of the objectives described below. Please make sure the amount of funding allocated to the programs/policies add up to 100%.



Q25. Vengeance scale

Please read each statement and indicate your level of agreement on the scale provided.

1. It is important for me to get back at people who have hurt me.
2. I try to even the score with anyone who hurts me.
3. I live by the motto 'let bygones be bygones'.
4. There is nothing wrong in getting back at someone who has hurt you.
5. I believe in the motto 'an eye for an eye; a tooth for a tooth'.
6. I find it easy to forgive those who hurt me.
7. If someone causes me trouble, I'll find a way to make them regret it.
8. If I'm wronged, I can't live with myself unless I get revenge.
9. Revenge is sweet.
10. Honour requires that you get back at someone who has hurt you.
11. Anyone who provokes me deserves the punishment that I give them.
12. People who insist on getting revenge are disgusting.
13. It's not worth my time or effort to pay back someone who has wronged me.
14. It is always better not to seek vengeance.
15. I don't just get mad, I get even.
16. I am not a vengeful person.
17. Revenge is morally wrong.
18. To have a desire for vengeance would make me feel ashamed.
19. It is usually better to show mercy than to take revenge.
20. It is always better to "turn the other cheek."

Q33. Debriefing Statement

Thank you for participating in our experiment. This study seeks to better understand how people behave and make decisions in group-relevant settings. Specifically, we are interested in understanding how various perceptions of threats may influence individual decision-making in groups, and how groups may collectively respond to deal with these stressors.

In this study, we predict that the imagination or recollection of potentially distressing or threatening incidents in your life or society will increase people's perceived identification with groups they belong to and their tendency to defend or enhance the welfare of other group members. For this reason, we needed to expose you to descriptions of events that may be threatening or distressing and ask you to think about these experiences.

Furthermore to assess potential tendencies to defend your own group or aggress against potentially threatening groups, we asked potentially sensitive questions about your willingness to self-sacrifice for your group or support actions that may harm other groups of people. We request that you do not share this information

with others, since prior knowledge about this aspect of our experiment may adversely affect from future participants.

If you choose to withdraw your data from the study based on the information provided on this debriefing, you may do so. You will still receive your compensation for participating in the study even if you choose to withdraw your data.

In addition, please feel free to contact Dr. Bobby Cheon (bkcheon@ntu.edu.sg) if you have any questions or concerns about the study. You may also contact the Nanyang Technological University Institutional Review Board (IRB) regarding your rights as a participant in the study (IRB@ntu.edu.sg).

Once again, we thank you for your participation in this experiment. Confirmation of understanding of the debriefing and consent for data to be used in the study:

I confirm that I have read and understood the content of this debriefing statement, and that I am aware that some procedures and information provided to me during this experiment was artificial with the intention of eliciting feelings of threat or insecurity, especially towards other groups of people. I acknowledge that I am not experiencing any significant negative feelings as a result of the questions or procedures I have completed during this experiment, and that I agree to have my responses and data be maintained and analyzed for this study.

- I AGREE with the statement above
- I DISAGREE with the statement above. Please do not include my data in this study (you will still receive reimbursement for completing the survey)

Q34. If you experience significant negative feelings or distress associated with the questions or measures you completed during this study, please contact the principal investigator: Assistant Professor Bobby Cheon (bkcheon@ntu.edu.sg). Thank you for your participation.

Appendix N: Serial mediational analyses

Regression coefficients of mediational analyses with unwillingness to self-sacrifice and anticipations of outgroup positivity predicting policy support categories on ingroup benefit and ingroup defence

	B	S.E	t	95% C.I.
Mediator variable models				
Perceived distinctiveness of ingroup memberships ²⁵				
Constant	3.25***	.19	17.20	2.88, 3.62
Social identity complexity	1.21***	.27	4.48	.68, 1.75
$F(1, 162) = 20.10***$				
$R^2 = .11$				
Unwillingness to self-sacrifice ²⁶				
Constant	4.54***	.26	17.52	4.03, 5.05
Social identity complexity	-.23	.23	-.97	-.69, .24
Perceived distinctiveness of	.17**	.06	2.61	.04, .29

²⁵ Perceived distinctiveness of ingroup memberships was reverse-scored based on the single item used as a manipulation check on the perceived overlap of the ingroup memberships after participants answered the social identity complexity manipulation task.

²⁶ Readiness to self-sacrifice for U.S. was reverse-scored to form a composite variable for unwillingness to self-sacrifice.

ingroup memberships				
$F(2, 161) = 3.40^*$				
$R^2 = .04$				
Anticipations of outgroup positivity ²⁷				
Constant	2.30***	.44	5.22	1.43, 3.17
Social identity complexity	-.006	.23	-.03	-.47, .46
Perceived distinctiveness of ingroup memberships	.01	.07	.23	-.11, .14
Unwillingness to self-sacrifice	.22**	.08	2.81	.07, .38
$F(3, 160) = 2.84^*$				
$R^2 = .05$				
Dependent variable models				
(4) Support for ingroup benefit policies				
Constant	7.08***	.64	11.10	5.82, 8.34
Social identity complexity	-.03	.31	-.09	-.65, .59

²⁷ Six items on perceptions of outgroup hostility – hateful, harmful, hostile, serious, fearful, and worried were reverse-scored and were averaged with four items on perceptions of outgroup positivity – supportive, friendly, safe, and sympathetic – to form a composite variable for anticipations of outgroup positivity.

Perceived				
distinctiveness of				
ingroup	-.15	.09	-1.72	-.32, .02
memberships				
Unwillingness to				
self-sacrifice	.33**	.11	3.01	.11, .54
Anticipations of				
outgroup	.06	.11	.59	-.15, .27
positivity				
$F(4, 159) = 3.11^*$				
$R^2 = .07$				
(5) Support for ingroup defence policies				
Constant	9.71***	.75	12.99	8.24, 11.19
Social identity				
complexity	-.22	.37	-.61	-.95, .50
Perceived				
distinctiveness of				
ingroup	-.28**	.10	-2.71	-.48, -.07
memberships				
Unwillingness to				
self-sacrifice	-.27*	.13	-2.17	-.52, -.02
Anticipations of				
outgroup	-.16	.12	-1.26	-.40, .09
positivity				

$$F(4, 159) = 5.33^{***}$$

$$R^2 = .19$$

(6) Forced-choice support for ingroup defence policies

Constant	40.89***	5.82	7.03	29.40, 52.39
Social identity complexity	-.79	2.86	-.28	-6.43, 4.86
Perceived distinctiveness of ingroup memberships	-.72	.80	-.91	.2.30, .85
Unwillingness to self-sacrifice	-2.21	.98	-2.24	-4.15, -.27
Anticipations of outgroup positivity	.80	.96	.83	-1.10, 2.71

$$F(4, 159) = 1.83$$

$$R^2 = .04$$

* $p \leq .05$, ** $p \leq .01$, *** $p \leq .001$.