

THE CONSEQUENCES OF VICARIOUS INTERGROUP EXCLUSION

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Declaration of Authorship

I, Dorottya Lantos, hereby declare that this thesis and the work presented in it is entirely my own. Where I have consulted the work of others, this is always clearly stated.

Dorottya Lantos

31 August 2020

*To my Father, Dr. Endre Lantos,
and my Grandfathers, Professor Aladár Porpáczy and Endre Lantos,
thank you for your endless support and for cheering me on since day one.*

*To István Csongor (1944-2020),
who always saw the good in people.*

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Abstract

Intergroup violence and conflict have devastating consequences for individuals and societies alike. Across five experimental studies ($N = 1,870$) conducted cross-culturally using a multi-method approach integrating behavioural and neuroscientific research methods, this thesis tested the consequences of vicarious intergroup exclusion, exclusion that concerns ingroup members, but that does not directly target the individual. The results indicate that the experimental manipulation of vicarious intergroup exclusion is experienced on the personal level, increasing perceived personal exclusion. At least under some conditions, it impairs mood (Studies 1-4), increases intergroup hostility (Studies 1, 4) and aggression (Study 3, 4), and threatens fundamental psychological needs (Study 1b). The increased aggression following the ingroup's observed exclusion may target not only members of the excluding outgroup, but members of 'innocent' outgroups as well (Study 3). The results further indicate that group status and power do not influence the effects of exclusion on mood, hostility, and aggression (Study 1b). Antagonistic, but not secure ingroup positivity was related to a greater increase in hostility following vicarious intergroup exclusion (Study 3). Vicarious intergroup exclusion affected hostility (Studies 1, 3, 4) and aggression (Studies 1b, 4) indirectly, via impaired mood, but not via threatened needs (Study 1b). Based on the underlying role of mood impairment, we tested interventions aiming to reduce the negative affect, intergroup hostility, and aggression related to vicarious intergroup exclusion by fortifying emotion regulation (Studies 2, 4). However, the interventions were unsuccessful in achieving these aims. Not all studies replicated all findings, so we summarized the main results observed throughout the thesis in meta-analyses. The meta-analytic summaries indicate that the intergroup settings used to create the experimental manipulation of vicarious intergroup exclusion (e.g., existing vs. minimal groups) influenced its effects. These findings, their implications, and future research directions are discussed in detail.

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“No one is born hating another person because of the colour of his skin, or his background, or his religion. People must learn to hate, and if they can learn to hate, they can be taught to love, for love comes more naturally to the human heart than its opposite.”

Nelson Mandela: The Long Walk to Freedom

PART I.
BACKGROUND

Chapter 1.

Summary of Research Objectives and Thesis Structure

Across 5 experimental studies, this thesis explored the effects of observing as members of one's ingroup experience social exclusion, i.e., emotional or physical separation from others against one's will (Riva & Eck, 2016a). The research presented here tested several hypotheses in attempt to gain a thorough understanding of not only the consequences of observed intergroup exclusion, but also the mechanisms underlying it and the conditions under which they may become enhanced or attenuated. It further tested interventions that may alleviate the negative consequences of vicarious intergroup exclusion, i.e., exclusion in the intergroup context that concerns ingroup members, but that does not personally target the individual (Veldhuis et al., 2014). The present research drew on a multi-method approach, integrating behavioural and neuroscientific research methods. It was conducted in cross-cultural settings. The aim of this introductory chapter is to provide a brief summary of the context and significance of the research presented in this Ph.D. thesis. It presents the main research aims and objectives, and introduces the secondary objectives. These focus on clarifying the exact conditions that may influence the effects of vicarious intergroup exclusion. The chapter concludes by providing an overview of the thesis structure, implemented to allow the reader to navigate this thesis with ease.

1.1. Research Context and Significance

Social exclusion impairs mood and often elicits aggression (Ren et al., 2018; Riva & Eck, 2016b; Williams et al., 2005), i.e., behaviour carried out with the intention to harm another individual (Anderson & Bushman, 2002; Berkowitz, 1993). The effects of social exclusion on the interpersonal level have been extensively investigated (Riva & Eck, 2016b; Williams, 2009; Williams et al., 2005). However, to date, only limited psychological research directly investigated the effects of merely observing as members of one's group are excluded

from social processes (Golec de Zavala, Federico, et al., 2019; Veldhuis et al., 2014). Thus, the psychological mechanisms underlying the often aggressive response are thus far not well understood.

The political and economic exclusion of marginalized groups is related to the escalation of intergroup conflict and violence (Choi & Piazza, 2016; Crenshaw, 1981; Wimmer et al., 2009). The increasing global support for populism and political polarization further warrants an in-depth understanding of the topic. Populist values and narratives appeal to those who believe that their group is devalued or excluded from certain social processes (objectively or subjectively; Golec de Zavala et al., 2020; Kaltwasser, 2012). This is compounded by populist rhetoric often promoting xenophobia and the social exclusion of other outgroups, leading those who may already feel excluded to engage in the social exclusion of further outgroups as well (Rooduijn & Akkerman, 2017). To reduce and prevent such vicious cycles, the effects of vicarious intergroup exclusion must be more extensively researched. Gaining a better understanding of how merely observing intergroup exclusion (rather than experiencing interpersonal exclusion) affects the individual and developing interventions aiming to curb the conflict related to intergroup exclusion are timely and important tasks.

1.2. Objectives

1.2.1. Primary objectives

Objective 1 of this thesis was to uncover the effects of vicarious intergroup exclusion, (Studies 1-4, Chapters 5-8; Veldhuis et al., 2014). Both interpersonal (Wesselmann et al., 2013) and intergroup exclusion (Veldhuis et al., 2014) may be experienced vicariously. Previous research conducted on interpersonal social exclusion (Ren et al., 2018; Wesselmann et al., 2013; Williams & Nida, 2011) and on vicarious intergroup exclusion (Golec de Zavala, Federico, et al., 2019) suggests that such experiences are related to an increase in aggression.

Thus, the research presented here devotes special attention to the effects of vicarious intergroup exclusion on intergroup hostile intentions (often preceding aggressive actions on the cognitive, rather than behavioural level; Anderson & Bushman, 2002) and aggression. It aimed to replicate previous research indicating that vicarious intergroup exclusion increases subsequent aggression (Golec de Zavala, Federico, et al., 2019). It also tested the effects of vicarious intergroup exclusion on novel, previously unexplored variables, including intergroup hostility and mood.

Objective 2 of this thesis was to uncover the psychological mechanism underlying the effects of vicarious intergroup exclusion on intergroup hostile intentions and aggression (Studies 1-4; Chapters 5-8). It is only through gaining a better understanding of this mechanism that strategies can be sought to counteract the intergroup hostility and aggression related to vicarious intergroup exclusion. Research suggests that aversive events, discomfort, and painful experiences prime aggression, each of which are related to negative affect (Anderson & Bushman, 2002; Berkowitz, 1989, 1993; Groves & Anderson, 2018). Social exclusion has been related to impaired mood and threatened fundamental psychological needs (Williams, 2009; Williams & Nida, 2011; Wirth & Williams, 2009). Self-report, behavioural, neuroimaging, and pharmacological data suggest that social exclusion causes social pain, comparable to physical pain (Eisenberger, 2012, 2015; Eisenberger & Lieberman, 2004). Taking into account the mediating role of mood impairment on the effects of interpersonal social exclusion on aggression (Chester & DeWall, 2017), this thesis tested the prediction that mood impairment drives the effects of vicarious intergroup exclusion on intergroup hostility and aggression.

Objective 3 of this thesis was to develop and test interventions aiming to reduce the negative effects of vicarious intergroup exclusion on mood, intergroup hostile intentions, and aggression (Studies 2 and 4, Chapters 6 and 8). Based on the assumption that mood

impairment mediates the effects of vicarious intergroup exclusion on intergroup hostility and aggression, the interventions employed here intended to fortify emotional resilience, thus allowing individuals to more adaptively downregulate arising negative affect. Following from previous research, two types of interventions were developed for this purpose. The first intervention used non-invasive brain stimulation to enhance neural activity in a specific brain region related to emotion regulation. The intervention was based on previous research demonstrating successful implementation of similar stimulation in the context of interpersonal exclusion, reducing its association with impaired mood and increased aggression (Study 2, Chapter 6; Riva et al., 2012; Riva, Romero Lauro, DeWall, et al., 2015).

Additional interventions employed mindfulness meditation as a means to enhance emotional resilience (Study 4, Chapter 8). Mindfulness refers to receptive attention to events occurring internally and externally, in any given moment without judgement or necessity to react (Martelli et al., 2018). Mindfulness meditation fosters this type of attention, and has been related to increased emotion regulation (Boyle et al., 2017; Garland et al., 2015; Wheeler et al., 2017), resilience to adversity (Kemeny et al., 2012; Kok et al., 2013; Porges, 2007), and threat (Brown et al., 2012, 2013), among others. Importantly, trait mindfulness has been related to decreased emotional distress during interpersonal social exclusion (Martelli et al., 2018). The practice of mindfulness meditation was thus expected to increase emotional resilience, mitigating the negative effects of vicarious intergroup exclusion.

1.2.2. Secondary objectives

As only scarce research previously explored the effects of vicarious intergroup exclusion (Golec de Zavala, Federico, et al., 2019; Veldhuis et al., 2014), not only its effects, but also the conditions under which these effects may appear or become enhanced are thus far unclear. This thesis aimed to clarify some such conditions. Based on previous research, it explored *i*) whether the effects of vicarious exclusion differ in the context of temporary or

permanent group memberships (Chapter 9; Wirth & Williams, 2009); *ii*) the role of group status and power in influencing the effects of vicarious intergroup exclusion (Study 1b, Chapter 5; Schaafsma & Williams, 2012; Schmitt & Branscombe, 2002a, 2002b); *iii*) the moderating role of selected forms of ingroup positivity (Study 3, Chapter 7; Golec de Zavala, Federico, et al., 2019); and *iv*) whether the intergroup hostility and aggression following vicarious intergroup exclusion increase when retaliatory in nature, targeting members of the excluding outgroup, compared to displaced hostility and aggression, directed towards members of ‘innocent’ outgroups who did not play a role in the ingroup’s exclusion (Study 3, Chapter 7; Chester & DeWall, 2017; Twenge et al., 2001). The rationale behind these additional research questions is described in detail in Chapter 2, while the exact hypotheses relating to them are summarised in Chapter 4. Investigating these questions further is expected to provide a more complete picture of vicarious intergroup exclusion, shedding light on additional factors that may influence its effects. Such clarifications will aid future implementation and application of the present research in valuable ways.

1.3. Thesis Structure

The structure of this thesis is presented in Figure 1.1. Chapter 2 of the thesis presents an in-depth overview of the literature which informed this research and the hypotheses tested. Chapter 3 discusses some key methodological details related to the manipulation of vicarious intergroup exclusion implemented across the studies. Chapter 4 presents an overview of the five empirical studies conducted to test the hypotheses, providing further methodological details as well as a summary of the hypotheses tested across the experiments. Figure 1.1 illustrates some details on the methodologies employed across the studies. A multi-method approach was used to test the hypotheses in an effort to provide data of sound quality, drawing on behavioural and neuroscientific (non-invasive brain stimulation) research methods throughout this thesis. Chapters 5-8 present the experimental studies and related data

analyses. Chapter 9 provides a meta-analytic summary of the main effects of vicarious intergroup exclusion based on the results of the experimental studies. It also compares the combined effect sizes observed in the context of temporary and permanent groups. Chapter 10 discusses the findings, their implications, limitations, and suggests directions for future research.

Figure 1.1

Thesis Structure

Part I.			Part II.						Part III.
Chapter 1.	Chapter 2.	Chapter 3.	Chapter 4.	Chapter 5.	Chapter 6.	Chapter 7.	Chapter 8.	Chapter 9.	Chapter 10.
Summary of Objectives and Structure	Theoretical Background	Methodological Background	Overview of Experiments	Behavioural Studies 1a & 1b, Investigating: Primary Objective 1, 2 Secondary Objective <i>ii</i>	Brain Stimulation Study 2, Investigating: Primary Objective 1, 3	Behavioural Study 3, Investigating: Primary Objective 1, 2 Secondary Objective <i>iii</i> , <i>iv</i>	Behavioural Study 4, Investigating: Primary Objective 1, 2, 3	Meta-Analytic Summary addressing: Primary Objective 1 Secondary Objective <i>i</i>	General Discussion, Implications, Future Directions

Note. The figure illustrates the focus of each chapter, the methodologies used to conduct the five experiments, and the primary and secondary research objectives explored in each of the experimental studies and the meta-analysis, as introduced in Chapter 1.

Chapter 2.

Social Exclusion and Intergroup Violence

Intergroup conflict and violence have devastating consequences for individuals and societies alike. The global economic impact of violence was \$14.76 trillion in 2017 alone, with the largest proportion (37%) spent on military expenditures (The Institute for Economics & Peace, 2018). The socioeconomic and political exclusion of minority groups plays a key role in the emergence of intergroup conflict and violence. Research suggests that the political marginalization of ethnic groups motivates civil wars and rebellions (Bonneuil & Auriat, 2000; Regan & Norton, 2005; Wimmer et al., 2009). Ethno-political exclusion and economic discrimination are related to terrorism (Choi & Piazza, 2016; Crenshaw, 1981; Hansen et al., 2018).

What happens when an individual is not directly excluded, but merely observes as members of their ingroup experience social exclusion? Are there ways to curb the related negative consequences? Although the effects of interpersonal (Riva & Eck, 2016b; Williams, 2009; Williams et al., 2005) and intergroup exclusion experienced directly (i.e., an experience of being personally excluded due to one's group membership; Bernstein et al., 2010; Gonsalkorale & Williams, 2007; Wirth & Williams, 2009) have been documented, there is thus far very limited research on the effects of vicarious intergroup exclusion (Golec de Zavala, Federico, et al., 2019; Veldhuis et al., 2014). Vicarious intergroup exclusion refers to the exclusion of ingroup members that is merely observed, and does not directly target the individual. This thesis aimed to understand the consequences of vicarious intergroup exclusion, focusing on its effects on intergroup hostile intentions and intergroup aggression, i.e., behaviour carried out with the intent to cause harm to the member(s) of an outgroup (Anderson & Bushman, 2002). It investigated the mechanisms underlying the effects of vicarious intergroup exclusion, focusing on its indirect effect via mood impairment, as well

as the circumstances that may influence the effects of vicarious intergroup exclusion. Finally, the research presented here also tested interventions aiming to reduce the effects of vicarious intergroup exclusion on mood impairment, intergroup hostility, and aggression. This chapter summarises previous literature, providing a foundation for the hypotheses tested throughout this thesis.

2.1. The Detrimental Effects of Interpersonal Exclusion

Social exclusion is the experience of being physically and/or emotionally separated from others, against one's will (Riva & Eck, 2016a). Experiencing social exclusion is truly devastating. Humans evolved under circumstances where their survival was dependent on being the member of a social group (Brewer, 2004; Lieberman, 2014). Those early communities provided their members with food, safety, and opportunities for successful reproduction. In this context, experiencing social exclusion (e.g., used to discipline a group member who violated norms or to expel a member who is harmful or threatening to the survival and safety of the group) signals an existential threat to the individual (Baumeister & Leary, 1995; Buss, 1990; Wesselmann et al., 2014). To ensure survival, humans had to evolve a kind of 'alarm system' that alerts them to signs of being excluded from these social groups (Wesselmann et al., 2012). Under this assumption, being expelled from a community, or feeling like one does not belong, should lead to negative affect and an experience of 'social pain', i.e., an affective response to perceiving that one is excluded from desired social relationships by other individuals or groups (MacDonald & Leary, 2005). Such negative feedback may be evolutionarily adaptive, since it signals to individuals that their momentary experience needs to be altered. A change in behaviour or circumstances may not only alleviate the immediate negative experiences related to social exclusion, but also promote wellbeing and the likelihood of survival over time.

Indeed, social exclusion decreases positive affect, increases negative affect, and immediately results in threat to our fundamental psychological needs: need to belong, self-esteem, meaningful existence, and control, respectively (Wesselmann et al., 2012; Williams, 2009; Williams & Nida, 2011). Our capacities to detect exclusion are so sensitive that such immediate effects are not only experienced in response to social exclusion happening in everyday life, but even in response to artificial situations induced in the laboratory (Nezlek et al., 2012). The effects are present even when one is excluded by members of a despised outgroup (Gonsalkorale & Williams, 2007) and can be experienced vicariously, i.e., merely observing the social exclusion of another individual may lead to feeling personally ostracised (Wesselmann et al., 2013). Worryingly, prolonged periods of social exclusion may lead to the deterioration of psychological and physical health, to experiencing life as meaningless, even to suicidal ideation and suicide (Bernstein et al., 2010; Eisenberger, 2013; Hames et al., 2018; MacDonald & Leary, 2005; Olié & Courtet, 2018; Stillman et al., 2009).

Self-report, behavioural, neuroimaging, and pharmacological data suggest that social pain caused by social exclusion is comparable to physical pain (Eisenberger, 2012, 2015; Eisenberger & Lieberman, 2004). People often describe exclusion experiences as 'painful'. Expressions such as having a 'broken heart' or 'feeling hurt' are widely prevalent across languages (MacDonald & Leary, 2005). Instructing participants to recall experiences of either social pain or physical pain have overlapping effects, both resulting in impaired mood, threatened psychological needs, and a desire to engage in aggression (Riva et al., 2011). Experimentally inducing either physical or social pain further results in an increased experience of being ignored and socially excluded. Such data support a common psychological response to social and physical pain.

Dozens of neuroimaging experiments further support this finding. The same core brain regions become active during the experience of social and physical pain (Eisenberger et

al., 2003; Eisenberger, 2012, 2015; Sturgeon & Zautra, 2016). Further support for the existence of a common neural network comes from research indicating that over-the-counter pain suppressants such as paracetamol or ibuprofen may not only reduce the experience of physical, but also social pain (DeWall, MacDonald, et al., 2010; Ratner et al., 2018). Overall, these findings provide a compelling argument for a neural system which evolved to detect the presence of pain, social or physical, and that the responses to the two experiences overlap as well.

2.2. The Aggressive Response to Interpersonal Exclusion

According to the temporal need threat model of ostracism, the experience of an impaired mood, threatened needs, and social pain happen immediately following the exclusion episode during a reflexive stage (Williams, 2009). In response to this unpleasant experience, individuals may be motivated to behave prosocially (seeking reinclusion), antisocially (engaging in aggression), or by completely withdrawing from social interactions (solitude seeking) during a subsequent reflective stage (Wesselmann & Williams, 2013). Here, we will briefly introduce research on prosocial behaviour following social exclusion, and focus on that exploring the aggressive reaction to social exclusion. Withdrawal has only recently been added to the temporal need threat model of ostracism as a third potential way of dealing with the pain of social exclusion (Ren et al., 2016). The research on it is still scarce and is not directly relevant to the present research questions. We will omit discussing this type of response from the present literature review.

One of the ways in which people often respond to ostracism is through affiliative, prosocial behaviour and being overly attentive to others (Williams, 2007, 2009; Williams & Nida, 2011). Such behaviour patterns should enable the opportunity to restore one's place in the group. It has been argued that a threatened need to belong and a threatened need to maintain self-esteem are what primarily drive the strive for reinclusion out of the

fundamental psychological needs explored by the temporal need threat model of exclusion. However, the prospect of reinclusion itself may also equip one with a sense of control over their situation, an additional fundamental psychological need.

Previous studies indicate that participants are less likely to engage in social loafing following social exclusion, while more likely to help others, express greater interest in joining clubs and in working together with others, and perceive others more positively (Baumeister & Leary, 1995; Maner et al., 2007; Williams & Sommer, 1997). Participants are further more likely to conform to the majority opinion and to act in a compliant or obedient way (Carter-Sowell et al., 2008; DeWall, 2010; Riva et al., 2014). Besides the vast amount of behavioural data supporting this hypothesis, it is further in line with nonconscious, automatic reactions, such as an increase in nonconscious mimicry following social exclusion (Lakin et al., 2008), something that has previously been shown to increase how likeable one is (Lakin & Chartrand, 2003). This increase in affiliative and prosocial behaviour in response to ostracism has been referred to as the *social reconnection hypothesis* (Baumeister & Leary, 1995).

Although exhibiting prosocial behaviour seems to be an evolutionarily adaptive response to ostracism, individuals may only be motivated to engage in such behaviour as long as reinclusion is thought to be possible (DeWall & Richman, 2011; Williams, 2009; Williams & Nida, 2011). In fact, a number of studies suggest that people not only become less helpful following ostracism, but that they routinely respond to it with aggression (Baumeister & Leary, 1995; Leary et al., 2006; Ren et al., 2018; Wesselmann et al., 2016). This is counterintuitive, since such hostile and uncooperative behaviour is unlikely to lead to repairing damaged social connections, developing new social bonds, or reintroducing one to the group. Yet aggression is a common response to experiences of negative affect and aversive events (Allen et al., 2018; Anderson & Bushman, 2002; Groves & Anderson, 2018).

It is plausible that the relationship between the experience of social exclusion and increased aggression is driven by the negative affect arising from the exclusion episode. Not only has social exclusion been shown to decrease mood and threaten fundamental psychological needs (Wesselmann et al., 2012; Williams, 2009; Williams & Nida, 2011), but it has also been related to an experience of social pain across multiple studies (Eisenberger, 2012, 2015; MacDonald & Leary, 2005). Both physical and emotional pain, amongst humans as well as nonhuman animals, increase aggression (Anderson & Bushman, 2002; Berkowitz, 1989, 1993; Berkowitz & Thome, 1987; MacDonald & Leary, 2005).

Pain often indicates that the individual is in danger and may activate a fight-or-flight response to ensure survival and safety (MacDonald & Leary, 2005). While fleeing the environment where harm is present may often be the most adaptive way of dealing with threat, defensive aggression may provide the greatest chance for survival when escape is difficult and uncertain. Pain often triggers this type of defensive aggression (Berkowitz, 1993; Berkowitz et al., 1981). Research in both humans and nonhuman animals suggests that this type of aggression elicited by pain may be directed towards not only those who are responsible for the individual's pain, but towards 'innocent' third parties as well (Berkowitz, 1993). Negative affect has been suggested to mediate the relationship between pain and aggression (Anderson & Bushman, 2002). In fact, experiences of pain and negative affect may be intimately related. While pain is often thought of as a physical experience, research indicates that it holds strong affective components (Craig, 2002; Eisenberger, 2015). Although pain sensations are often elicited by physical triggers, they are experienced via interoception.

Analogously to physical pain, as dozens of psychological and neuroscientific experiments illustrate that social exclusion often elicits aggression (Ren et al., 2018; Wesselmann et al., 2012; Williams & Nida, 2011), it is likely that the social pain and related

negative affect caused by the exclusion episode are what trigger this response. Indeed, studies found that negative affect mediated the relationship between social exclusion and aggression (Chester & DeWall, 2017). As in the case of physical pain, participants were found to engage in aggression towards not only the individual who excluded them, but towards innocent third parties as well following an episode of social exclusion (Rajchert et al., 2017; Twenge et al., 2001; Twenge & Campbell, 2003).

The idea that social pain and the related negative affect lead to aggression is further supported by neuroscientific evidence. Neuroimaging studies revealed increased activity in the pain matrix of the brain in response to interpersonal social exclusion, which correlates with subsequent aggression (Chester et al., 2014; Chester & DeWall, 2016a). This indicates that the more negative affect one experiences, the more likely they are to engage in subsequent aggression. Moreover, enhancing activity in brain regions implicated in emotion regulation and, specifically, the regulation of pain and negative affect using transcranial Direct Current Stimulation alleviates the negative effects of social exclusion (Riva et al., 2012; Riva, Romero Lauro, DeWall, et al., 2015). Undergoing brain stimulation as participants experienced social exclusion resulted in subsequent self-report ratings of mood, need threat, and subsequent willingness to engage in aggression comparable to those of participants allocated to experience social inclusion. Based on the summarised literature, the present research framework was built on the prediction that mood impairment related to the aversive nature of social exclusion and the negative affect caused by it underlie the relationship between exclusion and hostile intentions and behaviour (investigated here in the context of vicarious intergroup exclusion, as detailed in Section 2.3).

An alternative theory has also been put forward in attempt to explain the seemingly illogical aggressive (rather than prosocial) response to social exclusion. This suggests that in absence of the opportunity for reinclusion to the group, the individual will rely on repairing

their need to be in control and their need for a meaningful existence, two of the fundamental needs explored by the temporal need threat model of ostracism (Ren et al., 2018; Williams, 2009; Williams & Nida, 2011). Aggression is likely to prompt its target to respond in some way, making the individual feel less invisible. By engaging in aggression, it is possible to regain a sense of control over the social environment. However, as pain elicits aggression universally across many species, the experiences of pain and negative affect are likely stronger incentives for aggression, although the two theories are not necessarily mutually exclusive. Both mood and need threat are affected in similar ways by social exclusion (i.e., impaired mood and threatened needs), even when the conditions of exclusion are altered (e.g., assigning an individual a membership in minimal groups or real groups as they are excluded by outgroup members; Wirth & Williams, 2009). It is thus likely that these experiences are associated with each other, leading to similar consequences. The present research also investigated the indirect effects of social exclusion on hostile intentions and on aggression via threatened needs, and contrasted them to those occurring via mood impairment (investigated here in the context of vicarious intergroup exclusion, as detailed in section 2.3). This way, the present research attempted disentangling the unique effects of both processes.

2.3. Vicarious Intergroup Exclusion

A handful of experiments investigated how being personally excluded due to one's group membership may affect the consequences of social exclusion. When one perceives that they are excluded based on their group membership, the negative consequences of ostracism intensify (Goodwin et al., 2010; Wirth & Williams, 2009). The exaggeration of impaired mood and threatened fundamental psychological needs is especially pronounced when participants believe that they are excluded due to a permanent group membership (e.g., gender) compared to a temporary group membership (e.g., minimal group paradigms). Participants also reported having more hostile feelings towards their excluders when they

were the members of ethnic outgroups, compared to being excluded by members of their ingroup (Schaafsma & Williams, 2012). Additionally, participants reported less favourable views of and behaved more aggressively towards the entire outgroup that the excluders belonged to (Gaertner et al., 2008; Schaafsma & Williams, 2012). Being ostracised as part of a dyad has been found to increase subsequent hostility against the ostracisers, compared to being ostracised as a solo (van Beest et al., 2012). Overall, these results suggest that exclusion due to group membership increases the negative consequences of social exclusion, leading to greater mood impairment, and an increased experience of need threat. It also leads to an amplified subsequent aggressive response.

What happens when someone is not directly excluded due to their group membership, but merely observes as members of their ingroup are excluded by others? Research indicates that the political and economic exclusion of groups leads to the escalation of intergroup conflict and violence (Choi & Piazza, 2016; Regan & Norton, 2005; Wimmer et al., 2009). It is thus a timely topic that warrants scientific understanding. Yet the psychological mechanisms underlying the responses to observing the ingroup's exclusion have thus far not been investigated in detail.

Throughout human evolution, the ability to quickly categorize individuals as ingroup or outgroup members contributed to the successful navigation of complex social interactions (Turner, 1975). This type of perception enabled early humans to respond adaptively to outgroup members potentially posing a threat to their own (or to the ingroup's) survival. Today, we continue to categorize the world into 'us' and 'them', and this type of categorization extends to the self. Social identity theory posits that certain group memberships are associated with great value, and the social identity they grant may become integrated into one's own self-concept (Brewer, 2001; Tajfel & Turner, 1979; Turner & Reynolds, 2003).

In line with the social identity theory, not only behavioural (Coats et al., 2000; Latrofa et al., 2010; Smith et al., 1999; Smith & Henry, 1996), but also neuroimaging studies (Molenberghs & Louis, 2018; Scheepers et al., 2013; Scheepers & Derks, 2016) suggest that the mental representation of the self and other ingroup members overlaps. For example, a now classical study found an increased neural activity in pain-related brain regions as participants observed ingroup members receiving a painful stimulation in their faces via a needle vs. a non-painful control stimulation via a cotton swab (Xu et al., 2009). Notably, the same brain regions exhibit an increased activity when one experiences pain personally. However, such activity significantly decreased when observing outgroup members receiving the same stimulation. This illustrates that the human brain may be selective for the pain of ingroup members, and further supports similarities in the way that the human brain processes information related to the self and ingroup members.

Due to the overlapping mental representation of the self and the ingroup, it is in turn likely that the mere observation of one's group being excluded from social processes leads to effects similar to personally experiencing social exclusion. Indeed, we found that those observing as members of their national group were excluded from an online ball-tossing game by members of a national outgroup reported lower subsequent state self-esteem than a control group (i.e., one of the fundamental psychological needs) (Golec de Zavala, Federico, et al., 2019). They were also more likely to engage in retaliatory aggression following the game than participants in a control condition.

Using a similar method to manipulate vicarious intergroup exclusion, further research indicates that observing as a member of an ideological ingroup (e.g., liberals) was excluded from a ball-tossing game by two outgroup members induced an experience of personal humiliation compared to observing the exclusion of an outgroup member (Veldhuis et al., 2014). Self-reported personal humiliation following vicarious exclusion, however, did not

differ significantly from that reported after experiencing personal exclusion. A follow-up study suggests that participants also reported increased anger and powerlessness following the vicarious intergroup exclusion of ingroup members compared to participants observing the exclusion of members of one outgroup by members of a different outgroup. The effects on self-reported anger and powerlessness were only apparent once the manipulation was reinforced with additional information stating explicitly that the outgroup excluded the ingroup due to their political orientation. Notably, neither self-reported anger nor powerlessness differed significantly across participants personally experiencing social exclusion and those observing the exclusion of their ingroup.

To our knowledge, no further investigations to date have been published on the effects of vicarious intergroup exclusion. These results indicate that vicarious intergroup exclusion produces comparable effects to interpersonal social exclusion, while they prime aggression (Golec de Zavala, Federico, et al., 2019; Veldhuis et al., 2014). As previous research suggests that the intergroup context intensifies the effects of social exclusion (Goodwin et al., 2010; Wirth & Williams, 2009), we anticipated that the effects observed in the interpersonal context may translate to that of vicarious intergroup exclusion, perhaps becoming even more pronounced. We relied on previous work exploring the effects of interpersonal social exclusion to inform our predictions in the context of vicarious intergroup exclusion.

In the present thesis, we went beyond previously reported data by examining the effects of vicarious intergroup exclusion on novel variables; mood (Studies 1-4, Chapters 5-8), threatened fundamental needs (Study 1b, Chapter 5), and hostile intentions (Studies 1-4, Chapters 5-8), respectively, based on research in the interpersonal context (see Section 2.2). Previous research showed that vicarious intergroup exclusion leads to increased intergroup aggression (Golec de Zavala, Federico, et al., 2019). Here, we aimed to replicate the link

between vicarious intergroup exclusion and intergroup aggression (Studies 1b-4, Chapters 5-8). Finally, we proposed a framework to explain the mechanisms underlying the effects of vicarious intergroup exclusion on both hostile intentions and aggression, predicting that these relationships are mediated by impaired mood (Studies 1-4, Chapters 5-8) based on research in the interpersonal context (see Section 2.2).

2.4. Potential Conditions of Increased Hostile and Aggressive Response

2.4.1. The intergroup context

Drawing on previous research, we identified some circumstances and variables which may elevate the hostile and aggressive response to vicarious intergroup exclusion. These concern the settings of the intergroup context, the moderating effects of ingroup positivity, and the identity of the target outgroup. Whether an episode of interpersonal social exclusion occurs in the absence of any particular group membership being made salient, or whilst the individual's temporary or permanent group membership is perceived as the reason for the exclusion, participants report similar levels of immediate mood impairment and experiences of need threat (Wirth & Williams, 2009). Subsequent responses on the same indices of mood and need threat suggest that participants holding a temporary group membership during the exclusion episode experienced greater mood recovery and need satisfaction than participants holding a permanent group membership. These effects may be explained by different levels of identification concerning permanent and temporary groups.

Research conducted in the context of minimal group paradigms indicates that individuals readily identify with novel groups, even if their membership in the group is based on trivial categorization (e.g., eye colour; Tajfel & Forgas, 1981). Employing minimal group paradigms in research investigating intergroup relations may be beneficial as they control for any pre-existing beliefs about the groups. Nevertheless, permanent group memberships, such as nationality, may evoke stronger feelings of attachment to and identification with the group.

When prejudice concerns a group membership that the individual holds valuable, is unchangeable, and contributes to their identity, its effects are likely to intensify (Tajfel & Turner, 1979; Weiner, 1985; Weiner & Russell, 1979). Once the group membership becomes integrated with one's identity, such prejudice may impair their self-evaluation as well.

Indeed, in a recent experiment, we found that the vicarious exclusion of one's national group impaired their personal state self-esteem (Golec de Zavala, Federico, et al., 2019). It is plausible that the effects of vicarious intergroup exclusion are stronger in the context of existing, permanent groups, due to greater levels of pre-existing identification with the group. Across the studies presented in this thesis, we tested our hypotheses in intergroup settings created with imaginary (Studies 1-2, Chapters 5-6) as well as existing national group memberships (Studies 3-4, Chapters 7-8) in order to uncover whether the intergroup setting may influence the effects of vicarious intergroup exclusion. We explored whether the combined effect sizes relating to the main consequences of vicarious intergroup exclusion differ across the intergroup settings by conducting meta-analyses of the data collected (Chapter 9).

Belonging to a majority or minority group whilst being excluded by the opposite (i.e., majority group member excluded by minority group; minority group member excluded by majority group) did not influence the effects of exclusion in the interpersonal context (Schaafsma & Williams, 2012). However, there is reason to believe that group status, i.e., social prestige, and power, i.e., increased control over resources (Fiske et al., 2016), may influence the effects of vicarious intergroup exclusion. Members of marginalized groups are more likely to experience social exclusion in their daily lives, which in turn may lead to increased sensitivity to such episodes (Schmitt & Branscombe, 2002a, 2002b). For example, studies conducted in the US showed that African Americans are more likely to attribute social exclusion by Caucasian Americans to racism (Mendes et al., 2008). They also

experience such an episode of exclusion as more threatening than do Caucasian Americans experiencing exclusion by African Americans (Goodwin et al., 2010). Thus, in an exploratory manner we tested here whether vicarious intergroup exclusion committed by a high-status outgroup towards a low-status ingroup may inflate the consequences of exclusion, compared to that committed by a low-status outgroup towards a high-status ingroup (Study 1b, Chapter 5).

2.4.2. Ingroup positivity

Trait narcissism is characterised by self-entitlement and interpersonal antagonism (Miller et al., 2017). Its grandiose narcissism facet is associated with inflated self-views and a feeling of superiority to others, which is contingent upon external recognition. Research suggests that grandiose narcissists respond more strongly to the negative effects of interpersonal social exclusion, indicated by an amplified experience of anger following exclusion and by increased subsequent aggression (Twenge & Campbell, 2003). High trait self-esteem, i.e., stable self-positivity that does not entail feeling superior to others, and is not contingent upon external feedback (Brummelman et al., 2016), was not related to increased anger and aggression following social exclusion (Twenge & Campbell, 2003).

Further experiments indicate an increased activity in the pain related brain regions of grandiose narcissists during social exclusion, and found a relationship between this activity and subsequent aggression (Cascio et al., 2015; Chester & DeWall, 2016a). However, these studies did not find an association between grandiose narcissism and self-report measures of mood impairment following social exclusion. Such increased responses to social exclusion are likely due to an aversion experienced by individuals high in trait narcissism in response to the threat to their grandiose self-image. In the intergroup context, collective narcissism often predicts behaviour similar to that related to trait narcissism in the interpersonal context.

Collective narcissism refers to a belief that the ingroup is exceptional and entitled to privileged treatment, but that it is not sufficiently recognized by others (Golec de Zavala, Dyduch-Hazar, et al., 2019; Golec de Zavala & Lantos, 2020). It predicts hypersensitivity to any sign implying that the ingroup is devalued or ignored by members of an outgroup (Golec de Zavala et al., 2013; Golec de Zavala et al., 2016). Importantly, collective narcissism is related to hostile retaliation not only to real, but also merely perceived, as well as unintentional threats. For example, Portuguese participants endorsing national collective narcissistic beliefs indicated hostility towards Germans and positive feelings towards the German economic crisis following suggestions that Germany's position in the EU is more important than their own. Similarly, Polish participants indicated the readiness to engage in aggression towards an actor who made controversial jokes about their government. Such threats to the image of the ingroup are often only in the minds of these individuals, who readily interpret any event as derogatory to their group and as a cause for retaliatory aggression (Golec de Zavala, Dyduch-Hazar, et al., 2019; Golec de Zavala & Lantos, 2020).

Collective narcissism predicts intergroup behaviour beyond individual narcissism (Cai & Gries, 2013; Golec de Zavala, Cichocka, & Iskra-Golec, 2013; Golec de Zavala et al., 2016). However, a recent meta-analysis found a small but significant, positive correlation between individual grandiose narcissism and collective narcissism across different cultural contexts ($r = .13$; Golec de Zavala, Dyduch-Hazar, et al., 2019). Social identity theory posits that identifying as a member of a valued group contributes to one's personal self-concept (Deci & Ryan, 2000; Tajfel & Turner, 1979). Given the relationship between individual and collective narcissism, it is then likely that those endorsing collective narcissistic beliefs may be especially motivated to identify with a highly valued group in order to maintain or boost their personal self-esteem (Deci & Ryan, 2000; Tajfel & Turner, 1979). The inherent need to maintain the esteemed image of the ingroup may help explain the hypersensitivity associated

with collective narcissism, and why such individuals are so prone to lashing out with aggressive retaliation in response to threat to the ingroup's image. Under the assumption that individual narcissism predicts increased responses to interpersonal social exclusion due to threat to their self-image (Cascio et al., 2015; Chester & DeWall, 2016a; Twenge & Campbell, 2003), it is analogously likely that collective narcissism would lead to similarly exaggerated responses when the exclusion takes place in the intergroup context, due to threat to the ingroup's image.

Moreover, our recent experiment found that collective narcissism was related to increased aggression following an episode of vicarious intergroup exclusion, employed there as a manipulation to reduce state self-esteem (i.e., one of the fundamental psychological needs; Golec de Zavala, Federico, et al., 2019). This effect, however, was only visible once ingroup satisfaction was controlled for. Ingroup satisfaction refers to a secure form of ingroup attachment, characterised by positive ingroup views, feeling proud to be a member of the ingroup, and holding the ingroup to high value, that is noncontingent upon external recognition (Leach et al., 2008).

On the collective level of the self, ingroup satisfaction may be thought of analogously to self-esteem on the individual level of the self (Golec de Zavala, Dyduch-Hazar, et al., 2019; Golec de Zavala & Lantos, 2020). While collective narcissism and ingroup satisfaction are correlated, collective narcissism has been found to uniquely predict intergroup hostility (Golec de Zavala, Dyduch-Hazar, et al., 2019). In the context of the present research framework, we tested whether collective narcissism may moderate the effects of vicarious intergroup exclusion on intergroup hostile intentions and aggression, controlling for the unique effects of ingroup satisfaction (Study 3, Chapter 7). Study 3 additionally tested, in an exploratory manner, whether ingroup satisfaction may also uniquely lead to an increase in intergroup hostile intentions and aggression following an episode of vicarious intergroup

exclusion (controlling for collective narcissism). This way, we aimed to investigate whether a potential moderating effect is unique to antagonistic ingroup positivity, or whether responses to the exclusion episode may increase universally among those who exhibit stronger attachment to their ingroup.

2.4.3. Target outgroup

Interpersonal social exclusion leads to retaliatory as well as displaced aggression (Rajchert et al., 2017; Twenge et al., 2001; Twenge & Campbell, 2003). Following the exclusion episode, individuals may not only engage in aggression towards someone who participated in their exclusion, but also towards innocent third parties. However, whether the extent to which individuals engage in retaliatory and displaced aggression differs has not yet been explored.

Research suggests that only provoked aggression results in hedonistic pleasure, whereas nonprovoked aggression does not (Chester & DeWall, 2016b; Ramírez et al., 2005). Given the negative affect related to social exclusion (Williams & Nida, 2011; Wirth & Williams, 2009), it is plausible that individuals are increasingly motivated to engage in subsequent retaliatory aggression as a means to restore their impaired mood (Chester, 2017; Chester & DeWall, 2017). In an exploratory manner, we investigated whether vicarious intergroup exclusion leads to greater levels of retaliatory intergroup hostility and aggression than displaced intergroup hostility and aggression (Study 3, Chapter 7).

2.5. Fortifying Emotion Regulation to Alleviate the Negative Consequences of Vicarious Social Exclusion

Given our assumption that vicarious intergroup exclusion leads to increased hostile intentions and aggression via mood impairment, we proposed and tested two intervention programs aimed to alleviate these consequences through the enhancement of emotional resilience. The first intervention aimed to increase activity in a brain region related to

emotion regulation and the regulation of pain using transcranial Direct Current Stimulation (tDCS) as participants observed vicarious intergroup exclusion (Study 2, Chapter 6). Previous research found that such stimulation reduces the mood impairment and aggression following interpersonal social exclusion (Riva et al., 2012; Riva, Romero Lauro, DeWall, et al., 2015). The second intervention introduced a brief audio guided mindfulness meditation before participants observed their group's exclusion (Study 4, Chapters 8). Mindfulness refers to receptive attention to events occurring internally and externally, in any given moment without judgement or necessity to react (Martelli et al., 2018). Practicing mindfulness meditation was previously shown to increase resilience to threat and adversity, while fortifying emotion regulation (Boyle et al., 2017; Garland et al., 2015; Kemeny et al., 2012).

2.5.1. Fortifying emotion regulation using transcranial Direct Current Stimulation

TDCS uses a weak, electric current to modulate neural activity in a desired brain region (Nitsche & Paulus, 2011; Woods et al., 2016). It is a relatively novel technique, and thus there are still gaps in our understanding of its exact effects (Berker et al., 2013; Horvath et al., 2014). Nevertheless, due to its non-invasive nature and cost effectiveness, it is regularly used in laboratory and clinical settings as well. Two previous experiments used tDCS to stimulate the right ventrolateral prefrontal cortex (rVLPFC) as participants experienced social exclusion (Riva et al., 2012; Riva, Romero Lauro, DeWall, et al., 2015). The rVLPFC is a region that has been directly associated with emotion regulation, the regulation of physical pain, and the downregulation of negative emotions related to threat perception (Morawetz et al., 2017; Tupak et al., 2014; Wager et al., 2008). Neuroimaging experiments indicate a relationship between activity in this brain region and the inhibition of the social pain resulting from social exclusion (Eisenberger et al., 2003; Kross et al., 2007; Onoda et al., 2010).

The results of experiments applying anodal tDCS stimulation (i.e., stimulation aiming to increase neural activity in a given brain region) to the rVLPFC indicate that enhanced activity in this region diminishes the negative effects of social exclusion on mood and subsequent aggression (Riva et al., 2012; Riva, Romero Lauro, DeWall, et al., 2015). Participants receiving anodal stimulation (vs. sham stimulation) targeting the rVLPFC as they experienced interpersonal exclusion reported similar mood and engaged in comparable subsequent aggression as participants in a control condition, not experiencing social exclusion.

Other experiments found cathodal tDCS stimulation of the rVLPFC (i.e., stimulation aiming to inhibit neural activity in a given brain region) to increase the negative affect experienced following interpersonal social exclusion, compared to sham stimulation, and to the stimulation of a control brain region (Riva, Romero Lauro, Vergallito, et al., 2015). Further experiments using anodal tDCS stimulation of the rVLPFC support its role in modulating negative emotions (Vergallito et al., 2018) and aggression (Riva et al., 2017). Study 2 of this thesis went beyond previous research by testing whether the effects of anodal tDCS stimulation of the rVLPFC decrease the negative effects of observed intergroup exclusion, rather than direct interpersonal exclusion, through fortifying emotion regulation (Chapter 6).

2.5.2. Fortifying emotion regulation through mindfulness meditation

The practice of mindfulness meditation increases emotion regulation (Boyle et al., 2017; Garland et al., 2015; Wheeler et al., 2017), resilience to adversity (Kemeny et al., 2012; Kok et al., 2013; Porges, 2007), and threat (Brown et al., 2012, 2013). It has been shown to reduce provoked aggression (DeSteno et al., 2018), implicit racial prejudice (Lueke & Gibson, 2015) and to increase intergroup acceptance (Pinazo & Bresó, 2017). The effects of mindfulness on emotion regulation are so prevalent that some argue that the benefits of

mindfulness observed elsewhere (e.g., decreasing anxiety or depression relapse) are also attributable to this effect (Slutsky et al., 2017).

There is reason to believe that practicing mindfulness meditation and maintaining higher levels of trait mindfulness may equip one to better deal with the negative effects associated with social exclusion. Trait mindfulness has been related to decreased emotional distress during interpersonal social exclusion, evidenced by blood oxygenation level dependent signal change in relevant areas of the brain (Martelli et al., 2018). Mindfulness training has been further related to faster mood recovery following interpersonal social exclusion, but not to a decrease in subsequent aggression compared to a control condition (Keng & Tan, 2018; Molet et al., 2013). However, the study was underpowered ($N \leq 40$ per condition), potentially confounding the observed effects on aggression. Finally, mindfulness meditation leads to an increase in empathy, as well as prosocial emotions and behaviour towards an ostracized stranger (Berry et al., 2018).

The research surrounding mindfulness meditation has been criticized recently (Anderson et al., 2019; Van Dam et al., 2018). Due to an inconsistency in research methods (e.g., interventions of highly variable durations and meditation styles), it is difficult to draw conclusions based on previous literature and to build novel hypotheses based on such research. In order to overcome this issue, the present research employed two different styles of mindfulness meditation practice. Mindfulness meditation is often practiced with a focus on selected prosocial emotions, such as compassion or loving-kindness (Fredrickson et al., 2008). Gratitude, a feeling of being thankful for and appreciative of positive aspects of experience (Wood et al., 2010), is related to increased emotional resilience (Emmons & McCullough, 2003) and reduced interpersonal aggression (DeWall et al., 2012). In an attempt to further enhance the effects of mindfulness meditation on emotional resilience, Study 4 employed a mindfulness meditation intervention with a special focus on cultivating gratitude,

and compared its effects in an exploratory manner to a classic mindfulness meditation, without an additional focus on any self-transcendent emotions (Chapter 8). The effects of two types of mindfulness meditation were further compared to a control task. We predicted that mindfulness meditation would attenuate the negative effects of vicarious intergroup exclusion by fortifying emotional resilience.

Chapter 3.

Methodological Background: The Manipulation of Vicarious Intergroup Exclusion

Across five studies, this Ph.D. thesis investigated the effects of vicarious intergroup exclusion. The manipulation employed across each of the studies is based on the Cyberball paradigm, an online ball-tossing game originally developed to induce the personal experience of social exclusion (Williams et al., 2000; Williams & Jarvis, 2006). This chapter introduces the original paradigm, and details how this manipulation was adapted across this thesis to the intergroup setting, in a manner that fits the context of vicarious, rather than direct exclusion.

3.1. Manipulating Interpersonal Exclusion: Cyberball

A wealth of methods have been devised for inducing social exclusion in the laboratory. Wirth (2016) assigned these methods into three broad categories; interacting with computer avatars, interacting with other individuals, and written material manipulations, respectively. Often, exclusion paradigms include avatars whose actions are pre-programmed, although the participant is led to believe that they are interacting with other participants. Here, we focus on Cyberball, a manipulation that activates relevant negative feelings associated with the experience of exclusion surprisingly accurately (Williams et al., 2000; Williams & Jarvis, 2006). This paradigm has been used to date in over 200 peer-reviewed journal articles (for an up-to-date list, see http://www1.psych.purdue.edu/~willia55/Announce/Cyberball_Articles.htm), showing excellent reliability, with large effect sizes (the average effect size from 120 Cyberball studies investigated by a recent meta-analysis was $d > |1.4|$; Hartgerink et al., 2015).

The original Cyberball paradigm allows participants to take part in a ball-tossing game with two other, ostensibly real people (Williams et al., 2000; Williams & Jarvis, 2006). Unbeknownst to participants, the games are pre-programmed, and no other players are involved. Participants are generally instructed that their performance does not matter in the

game, and that the aim of the exercise is for them to mentally visualize everything that happens on the screen. Under the control condition of social inclusion, each player receives the ball equally, 33% of the time. However, under the condition of social exclusion, the participant gets completely excluded from the game after receiving two to three throws (~10% of the total throws) initially. It is easy to creatively alter Cyberball, making it suitable for introducing minimal groups (e.g., Wirth & Williams, 2009), for altering the political ideology (e.g., Gonsalkorale & Williams, 2007), nationality (e.g., Schaafsma & Williams, 2012), or the gender (e.g., Wirth & Williams, 2009) of the players, among others, by providing participants with additional information about the players they are ostensibly interacting with.

3.2. Manipulating Vicarious Intergroup Exclusion

In the present research framework, we were interested in manipulating the experience of vicarious intergroup exclusion. In all studies presented here, we used an adapted version of the original Cyberball paradigm (Williams et al., 2000; Williams & Jarvis, 2006). In line with the usual set of instructions, we told participants that we were investigating their mental visualization skills. They were led to believe that the game was used as a way of training their mental visualization abilities, and that their task was to visualize everything on the screen as realistically as possible, whilst their or others' performance in the game did not really matter.

Participants were led to believe that they would be connected to other participants online, and randomly assigned to either take part in the Cyberball game as a player or observer. In reality, no other participants were involved, all of the games were pre-programmed, and all participants were assigned to the condition of observer. They watched as three members of their own ingroup (an imaginary group or national group) played the ball-tossing game with three members of an outgroup (imaginary or national). Each game

consisted of 30 ball tosses. In the control social inclusion condition, both teams received the ball 50% of the time. In the vicarious intergroup exclusion condition, ingroup members received the ball only three times in the beginning of the game (10% of total throws) and were excluded afterwards.

The intergroup context was created by colouring the avatars belonging to each of the groups with distinct colours and writing the (real or imaginary) nationalities that they belong to underneath them. A similar version of the Cyberball paradigm has been successfully employed before in the context of vicarious intergroup exclusion. Two studies aimed to directly investigate the effects of vicarious intergroup exclusion, one of which used a Cyberball paradigm where participants observed as two outgroup members excluded one ingroup member from the game, whereas in the other, two outgroup members excluded two ingroup members from the game (Veldhuis et al., 2014). These manipulations both induced a sense of personal humiliation in participants, while the latter also induced a feeling of anger and powerlessness when reinforced with information indicating that the ingroup members were specifically excluded because of their group membership.

One other experiment used the Cyberball manipulation identically to the method employed throughout this research, an adaptation of the Cyberball paradigm in which the ballgame happens between two groups of three avatars (Golec de Zavala, Federico, et al., 2019). The aim of that experiment was to experimentally lower personal state self-esteem (i.e., one of the fundamental psychological needs shown to be affected by social exclusion; Williams, 2009). The manipulation achieved this aim successfully, whilst it also increased subsequent aggression. Thus, previous research indicated that this type of manipulation would be successful at inducing an experience of vicarious intergroup exclusion.

PART II.
HYPOTHESIS TESTING

Chapter 4.

Overview of the Present Research

The present research had three main objectives: (1) to gain a better understanding of the effects of vicarious intergroup exclusion, with a special focus on intergroup hostility and aggression; (2) to understand the mechanism underlying these effects; and (3) to test interventions which may counteract these adverse consequences. Furthermore, the secondary objective of the research was to clarify the circumstances under which the effects of vicarious intergroup exclusion may become enhanced or attenuated. To tackle each of these objectives, five experimental studies were conducted. Throughout these experiments, we tested a total of eight hypotheses (Table 4.1). The main effects of vicarious intergroup exclusion observed throughout these studies were additionally entered into a meta-analysis, aiming to provide a summary of their combined effects and effect sizes. This chapter provides an overview of the hypotheses tested throughout this research, providing key methodological details related to each of the experiments.

4.1. Summary of Hypotheses

Interpersonal social exclusion often leads to aggression (Ren et al., 2018; Williams et al., 2005; Williams & Nida, 2011). The effects of exclusion intensify when one perceives that they are excluded due to a group membership (Gonsalkorale & Williams, 2007; Schaafsma & Williams, 2012; Wirth & Williams, 2009). Both interpersonal (Wesselmann et al., 2013) and intergroup exclusion may be experienced vicariously (Veldhuis et al., 2014), and previous research indicates that vicarious intergroup exclusion is related to an increase in subsequent symbolic aggression (Golec de Zavala, Federico, et al., 2019). Here, we tested the predictions (Hypothesis 1a) that vicarious intergroup aggression leads to an increase in intergroup hostile intentions and (Hypothesis 1b) intergroup aggression. Hostile intentions have not been investigated in the context of vicarious intergroup exclusion previously. They may precede

aggressive behaviour on the cognitive level (Anderson & Bushman, 2002). The manipulation used here to induce the experience of vicarious intergroup exclusion is fairly mild: It entails the exclusion of ingroup members from an online ball-tossing game (Chapter 3). Thus, we included the dependent variable of intergroup hostile intentions across the studies to account for the possibility that aggressive intent in this context might not translate into overt aggressive behaviour.

Research suggests that social exclusion in the interpersonal context increases negative affect and decreases positive affect (Ren et al., 2018; Williams & Nida, 2011; Wirth & Williams, 2009). It has been associated with an experience of social pain (Eisenberger, 2015; Eisenberger et al., 2003; Eisenberger & Lieberman, 2004; MacDonald & Leary, 2005). Social and physical pain both hold strong affective components (Craig, 2002). The relationship between interpersonal social exclusion and subsequent aggression is mediated by impaired mood (Chester & DeWall, 2017). As these factors each share a common affective component, we predicted (Hypothesis 2a) that vicarious intergroup exclusion impairs mood, and that (Hypothesis 2b) vicarious intergroup exclusion increases intergroup hostility and (Hypothesis 2c) intergroup aggression indirectly, via impaired mood.

Some previous work indicates that instead, this indirect effect may happen via a threat to fundamental psychological needs (Ren et al., 2018; Williams, 2009). Although arguably need threat also encompasses an affective component, we contrasted Hypothesis 2 to Hypothesis 3, predicting that (Hypothesis 3a) vicarious intergroup exclusion threatens fundamental psychological needs, and (Hypothesis 3b) vicarious intergroup exclusion increases intergroup hostile intentions and (Hypothesis 3c) intergroup aggression indirectly, via need threat.

Research suggests that in the interpersonal context, whether one experiences exclusion based on their group membership in a minority or majority group does not

influence the effects of exclusion (Schaafsma & Williams, 2012). Yet there is reason to believe that belonging to a group with higher status and power may serve a protective function against the negative effects of exclusion (Schmitt & Branscombe, 2002a, 2002b). Thus, we tested the prediction (Exploratory Hypothesis 4) that belonging to a low-status, low-power group as one observes the exclusion of their ingroup by high-status, high-power outgroup members intensifies the effects of vicarious intergroup exclusion.

We further investigated whether the anticipated effects may arise only in existing intergroup contexts, or also in imaginary intergroup contexts. Although research suggests that individuals readily identify with minimal groups when allocated to them based on trivial factors (Tajfel & Forgas, 1981), existing ingroups may be more integrated into their self-concept and identity (Tajfel & Turner, 1979; Turner, 1978). Experimental data suggest that the effects of interpersonal exclusion are more pronounced when the exclusion is attributed to one's permanent, rather than temporary group membership (Wirth & Williams, 2009). Thus, it is possible that the effects of vicarious intergroup exclusion are also more pronounced when the exclusion concerns a real, existing ingroup. Thus, Studies 1 and 2 were conducted in an imaginary intergroup context, whereas Studies 3 and 4 were conducted in a national intergroup context. We provided a meta-analytic summary of the main effects of vicarious intergroup exclusion observed throughout these studies separately across both intergroup contexts to further explore this research question.

Trait narcissism, but not self-esteem, has been found to increase the aggressive response to interpersonal social exclusion (Cascio et al., 2015; Chester & DeWall, 2016a; Twenge & Campbell, 2003). Those endorsing collective narcissistic beliefs about their ingroup anticipate privileged and special treatment from others, are hypersensitive to any signs that their group is devalued, and have a tendency to respond with hostility and aggression to such signs (Golec de Zavala, Dydych-Hazar, et al., 2019; Golec de Zavala &

Lantos, 2020). Collective narcissism has also been related to an increased aggressive response following vicarious intergroup exclusion, but only when a secure form ingroup attachment, ingroup satisfaction was controlled for (Golec de Zavala, Federico, et al., 2019). Here, we tested the predictions (Hypothesis 5a) that collective narcissism (controlling for its overlap with ingroup satisfaction) is related to a greater increase in intergroup hostile intentions and (Hypothesis 5b) intergroup aggression following vicarious intergroup exclusion.

In an exploratory manner, we further tested whether such effects are exclusive to antagonistic ingroup positivity, or whether they may also be present across different forms of ingroup positivity as well. We focused on ingroup satisfaction, a secure form of ingroup positivity, characterised by feelings of pride toward the ingroup, noncontingent upon external recognition (Leach et al., 2008). We tested the predictions (Exploratory Hypothesis 6a) that ingroup satisfaction (controlling for its overlap with collective narcissism) is related to a greater increase in intergroup hostile intentions and (Exploratory Hypothesis 6b) intergroup aggression following vicarious intergroup exclusion.

Retaliatory aggression has been well documented in response to provocation (Chester, 2017; Chester & DeWall, 2016b, 2017). Such research indicates that aggressive retaliation may lead to mood improvement. Similar hedonistic pleasure has not been documented in the context of nonprovoked aggression. In the interpersonal context, social exclusion has been found to lead not only to retaliatory aggression towards the excluders, but also to displaced aggression towards 'innocent' third parties who had no role in the individual's social exclusion (Rajchert et al., 2017; Twenge et al., 2001; Twenge & Campbell, 2003). The extent of this type of displaced aggression, however, has not yet been compared to the extent of retaliatory aggression following social exclusion. Given the mood impairing nature of exclusion, it is possible that individuals more readily engage in retaliatory aggression

following an episode of vicarious intergroup exclusion than in displaced aggression, relying on it as a means to repair mood. In an exploratory manner, we investigated this question, proposing that (Exploratory Hypothesis 7a) vicarious intergroup exclusion increases retaliatory intergroup hostile intentions (compared to displaced), and (Exploratory Hypothesis 7b) and retaliatory intergroup aggression (compared to displaced).

This research project finally aimed to test interventions that may alleviate the negative consequences of vicarious intergroup exclusion. Based on the consequences predicted by Hypotheses 1a and 1b (i.e., increased intergroup hostile intentions and aggression), and its underlying mechanism predicted by Hypothesis 2 (i.e., that the effects may happen indirectly, via mood impairment), the interventions were designed to fortify emotional resilience. We predicted that (Hypothesis 8a) interventions fortifying emotional resilience break the link between vicarious intergroup exclusion and mood impairment, (Hypothesis 8b) increased intergroup hostile intentions, and (Hypothesis 8c) increased intergroup aggression. Table 4.1 presents a summary of all hypotheses.

Table 4.1

Summary of All Hypotheses Tested Across the Present Research Project, Along Information on the Exact Studies Examining Them

Hypothesis	Studies	Prediction
1a	1, 2, 3, 4	Vicarious intergroup exclusion leads to increased intergroup hostile intentions,
1b	1b, 2, 3, 4	and increased intergroup aggression.
2a	1, 2, 3, 4	Vicarious intergroup exclusion impairs mood,
2b	1, 3, 4,	and indirectly increases intergroup hostile intentions

2c	1b, 3, 4	and intergroup aggression via impaired mood.
3a	1b	Vicarious intergroup exclusion threatens fundamental psychological needs,
3b	1b	and indirectly increases intergroup hostile intentions
3c	1b	and intergroup aggression via increased need threat.
Exploratory 4a	1b	Belonging to a low-status, low-power group whilst observing the social exclusion of ingroup members by a high-status, high-power group inflates the subsequent mood impairment,
Exploratory 4b	1b	intergroup hostile intentions,
Exploratory 4c	1b	and intergroup aggression.
5a	3	Following vicarious intergroup exclusion, individuals endorsing collective narcissistic beliefs (controlling for ingroup satisfaction) exhibit a greater increase in intergroup hostile intentions,
5b	3	and a greater increase in intergroup aggression.
Exploratory 6a	3	Following vicarious intergroup exclusion, individuals high in secure ingroup attachment (i.e., ingroup satisfaction, controlling for collective narcissism) exhibit a greater increase in intergroup hostile intentions,
Exploratory 6b	3	and greater increase in intergroup aggression.
Exploratory 7a	3	Vicarious intergroup exclusion increases retaliatory intergroup hostile intentions (compared to displaced),
Exploratory 7b	3	and retaliatory intergroup aggression (compared to displaced).
8a	2, 4	Interventions fortifying emotional resilience break the link between vicarious intergroup exclusion and mood impairment,

8b	2, 4	increased intergroup hostile intentions, and
8c	2, 4	increased intergroup aggression.

4.2. Overview of the Experimental Studies

Studies 1a ($N = 483$) and 1b ($N = 319$) were conducted online in an imaginary intergroup context (Chapter 5). The aim of these experiments was to test Hypotheses 1 (that vicarious intergroup exclusion increases intergroup hostile intentions and aggression) and 2 (that this increase in hostile intentions and aggression may happen indirectly, via a decrease in mood) in the context of minimal group paradigms. The minimal group paradigm was selected due to data suggesting that individuals readily identify with their group allocated in this manner, while it allows one to control for any pre-existing beliefs relating to in- and outgroups that may otherwise confound the results (Tajfel & Forgas, 1981). Study 1b extended the methodology and findings of Study 1a by additionally comparing Hypothesis 2 to an alternative Hypothesis 3 (that vicarious intergroup exclusion leads to intergroup hostility and aggression indirectly, via threatened fundamental psychological needs). Study 1b further included a manipulation of group status and power, in order to test Exploratory Hypothesis 4 (that belonging to a low-status, low-power group whilst observing the social exclusion of ingroup members committed by members of a high-status, high-power outgroup inflates the negative effects of vicarious intergroup exclusion).

Study 2 ($N = 73$) used the same imaginary intergroup context as Study 1, this time conducted under laboratory conditions. The primary aim of the study was to test the first intervention aiming to alleviate the negative consequences of vicarious intergroup exclusion. We applied non-invasive brain stimulation to enhance activity in a brain region previously shown to play a key role in emotion regulation (Riva, Romero Lauro, Vergallito, et al., 2015). We followed the procedure of previous research indicating that this type of stimulation

successfully alleviated mood impairment and aggression following exclusion in the interpersonal context (Riva et al., 2012; Riva, Romero Lauro, DeWall, et al., 2015). Study 2 tested Hypotheses 1 and 2a, as well as Hypothesis 8 (that an intervention fortifying emotional resilience breaks the link between vicarious intergroup exclusion and mood impairment, increased intergroup hostile intentions, and increased intergroup aggression).

Studies 3 and 4 were conducted using national groups to create the intergroup context. Exploring vicarious intergroup exclusion in the context of real groups was important, as previous research indicates that attributing exclusion to one's permanent, rather than temporary group membership may intensify its negative effects (Wirth & Williams, 2009). Study 3 ($N = 289$) was conducted online, recruiting a US sample. To control for the confounding effects of pre-existing intergroup conflict or negative attitudes towards the outgroup, we selected a group that is similar in their political and economic power, and is perceived as likeable by the US population: Great Britain (McCarthy, 2020). This study aimed to replicate Hypotheses 1 and 2 in the context of existing national groups. It further tested Hypothesis 5 (predicting that individuals endorsing collective narcissistic beliefs exhibit a greater increase in intergroup hostile intentions and in intergroup aggression following an episode of vicarious intergroup exclusion) as well as Exploratory Hypothesis 6 (predicting that individuals high in ingroup satisfaction exhibit a greater increase in intergroup hostile intentions and in intergroup aggression following an episode of vicarious intergroup exclusion). Finally, Study 3 also explored whether vicarious intergroup exclusion leads to greater levels of retaliatory than displaced intergroup hostility and aggression, testing Exploratory Hypothesis 7.

Study 4 ($N = 706$) was conducted online in a sample of Polish adults. The intergroup context was created by selecting a minority national group as the outgroup, Ukrainians. A recent national survey found that 41% of Poles reported that they hold negative views

towards Ukrainians, while 31% reported positive attitudes (Polish Public Opinion Research Center, 2019). Due to the similar percentages, we anticipated that across the sample neither the negative nor the positive views would confound the results. Study 4 aimed to replicate Hypotheses 1 and 2 in this novel national context. It additionally assessed how participants allocated to two novel interventions based on mindfulness meditation practice (a standard mindfulness meditation and a mindful gratitude meditation, developed in collaboration with a certified mindfulness trainer) would respond to the effects of vicarious intergroup exclusion compared to participants allocated to a control condition. We predicted that the mindfulness meditation intervention would break the link between vicarious intergroup exclusion and mood impairment, increased intergroup hostility, and aggression. Thus, Study 4 tested Hypothesis 8, employing different interventions than that used in Study 2.

4.3. Additional Considerations

Data cumulated over decades of research focusing on aggression indicate that aggressive behaviour tends to be more prevalent across males than females (Archer, 2009; Hyde, 1984). In the present research, aggression only differed across genders in one of the experimental studies (Study 4, Chapter 8; see also the effects of gender on aggression reported for each study in Appendix A). Even in that study, the effect size was $\eta^2 = .01$, indicating that gender only accounted for 1% of the total variance in intergroup aggression (Lakens, 2013). For this reason, and to keep the analyses consistent across the studies, we did not control for gender across the analyses reported throughout this thesis.

Chapter 5.

Studies 1a and 1b: The Effects of Vicarious Intergroup Exclusion in the Context of Imaginary Groups

The first objective of the present research was to explore the way in which vicarious intergroup exclusion effects intergroup hostile intentions and aggression. It additionally aimed to understand the mechanism underlying this relationship. While extensive research has been conducted on how personal exclusion affects individuals (Ren et al., 2018; Williams et al., 2005; Williams & Nida, 2011), the effects of merely observing as one's ingroup members experience social exclusion is thus far not well understood (Golec de Zavala, Federico, et al., 2019; Veldhuis et al., 2014). Study 1 aimed to tackle these objectives in the settings of an imaginary intergroup context. Specifically, Study 1a tested Hypothesis 1a, that vicarious intergroup exclusion leads to intergroup hostile intentions. Hostile intentions have never previously been examined in the context of observed intergroup exclusion. They often precede aggressive behaviour (Anderson & Bushman, 2002). Thus, effects may be observed on such intentions even when participants do not engage in actual aggression. This was a possibility here, due to the mild manipulation of vicarious intergroup exclusion employed, involving a ballgame between an imaginary in- and outgroup. Study 1a additionally aimed to understand the mechanism underlying the link between vicarious intergroup exclusion and intergroup hostile intentions. It tested the predictions (Hypothesis 2a) that vicarious intergroup exclusion impairs mood, and (Hypothesis 2b) that the effects of vicarious intergroup exclusion on intergroup hostile intentions may happen indirectly, via impaired mood.

Study 1b aimed to replicate the findings of Study 1a. It further aimed to replicate previous findings suggesting participants engage in increased levels of retaliatory aggression following vicarious intergroup exclusion (Hypothesis 1b; Golec de Zavala, Federico, et al.,

2019). Previous research, however, relied on creating the intergroup context using existing national groups. Thus, it is unclear whether the results would remain present in an imaginary intergroup context, where participants do not hold pre-existing attachments related to their group. Study 1b additionally tested the prediction (Hypothesis 2c) that vicarious intergroup exclusion effects intergroup aggression indirectly, via impaired mood. It further aimed to confirm Hypothesis 2 by comparing it to an alternative model: It tested Hypothesis 3, predicting that the relationship between vicarious intergroup exclusion and hostile intentions, and between vicarious intergroup exclusion and intergroup aggression occurs indirectly via an increase in threat to fundamental psychological needs.

The present research further aimed to gain a better understanding of the conditions under which the effects of vicarious intergroup exclusion on intergroup hostile intentions and aggression may intensify or become attenuated. Previous research examined the effects of being personally excluded due to a minority group membership by members of a majority group, and found that they did not differ from being personally excluded due to a majority group membership by members of a minority group (Schaafsma & Williams, 2012). Yet there is reason to believe that belonging to a group that holds a high status, i.e., social prestige, and power, i.e., control over resources (Fiske et al., 2016), may protect against the negative effects of vicarious intergroup exclusion. Members of marginalized groups are more likely to experience social exclusion in their daily lives, which in turn may lead to increased sensitivity to such episodes (Schmitt & Branscombe, 2002a, 2002b). Thus, Study 1b further included a manipulation of group status and power to assess these effects. It tested the prediction (Exploratory Hypothesis 4) that belonging to a low-status, low-power group whilst observing the social exclusion of ingroup members committed by members of a high-status, high-power outgroup inflates the negative effects of vicarious intergroup exclusion.

5.1. Study 1a

5.1.1. Method

5.1.1.1. Power analysis

In order to estimate the sample size necessary to test Hypotheses 1 and 2 with power of .80 and $\alpha = .05$, we used the MedPower software (Kenny, 2017) and computed a priori power calculations. We obtained relevant effect sizes reported in previous research and converted these to r coefficients using Psychometrica's effect size calculator software (Lenhard & Lenhard, 2016): the association between observed social exclusion and impaired mood, $\eta^2 = .35$ (Wesselmann et al., 2009, Study 1), to $r_a = .59$; between mood and aggression following social rejection, $d = .58$ (Bushman et al., 2001, Study 1), to $r_b = .28$; and between social exclusion and aggression, $d = .25$ (Chester & Dzierzewski, 2019, Study 1), to $r_c = .12$, respectively. The analysis yielded a necessary sample size of 69 to test the total effect of vicarious intergroup exclusion on hostile intentions predicted by Hypothesis 1a. The analyses revealed a necessary sample size of 98 to detect the indirect relationship between social exclusion and hostile intentions via impaired mood predicted by Hypothesis 2. We conservatively oversampled, ending participant recruitment on a predetermined date.

5.1.1.2. Participants

Four hundred ninety-seven participants completed the survey via Amazon MTurk. Before starting the survey, participants read a brief description of the Cyberball game (Williams et al., 2000; Williams & Jarvis, 2006) and were asked to only participate if they have no previous familiarity with it. We implemented attention checks throughout the survey at five points, instructing participants to select a specific option in response to the question (e.g., 'Please select Agree'). We excluded participants who responded incorrectly to either of these questions ($N = 14$). As a final attention check measure, we asked participants to indicate whether their group took part in the Cyberball game or not. All participants responded correctly to this question.

We asked participants to indicate how many times in total the ball was passed among the players. The game consisted of 30 ball throws, so a very low answer may indicate that the participant was not paying attention, or that they had technical issues and the game did not run as we intended. Because the participant is a passive observer rather than player in the adapted version of the game used here, we do not have a way of making sure that they were truly watching the screen throughout. Eighteen participants indicated that the ball was tossed seven or less times in total. Excluding these participants did not change the main pattern of the results, so for the sake of power, and because we cannot be certain about the reason behind their response, we report the following analyses with the inclusion of these participants.

The final sample consisted of 483 participants, 237 females, 243 males, and 3 participants disclosing their gender as 'other'. Participants were between the ages 20 and 73 ($M = 36.16$, $SD = 10.53$). Participants were reimbursed with 1.00 USD for their time.

5.1.1.3. Procedure and measures

We created an online questionnaire ostensibly investigating the link between personality and mental visualization using Qualtrics Software. The survey began with a consent form. We told participants that they would take part in a role-playing game to train their mental visualization abilities (see Chapter 3 for further details). Ethical approval for this experiment was granted by the Goldsmiths Ethics Committee.

Assigning group membership. Following some demographic questions, participants were provided with information about two imaginary nations, Minay and Bray, home to the Minayzirith and Brayzirith people (adapted from Keenan, 2016):

There is a world with a nation of people named the Minayzirith. They hail from the land of Minay, a vibrant country where one can move from the

sprawling cities, open plains, and deep green forests freely. It also sits on the Samudra Sea, which their main river, the Salilaraya, flows into. Its capital, which sits on the Salilaraya, is called Mintoroan and has millions of inhabitants each leading bustling lives. Bordering Minay to the west lies the country of Bray, where the source of the Salilaraya is found, and the nation of the Brayzirth reside. Bray is similarly full of lush forests, though it is more mountainous, with great cities carved out from the rock faces. Its capital, Bramoazen, is a dense and active city, and sits at the base of the Apotheozen mountains, where millions of Brayzirth are also leading interesting lives.

One of these lands would like to welcome you as a valued member and citizen. Following are some questions to assess your suitability to one of the lands.

Participants completed questions ostensibly used to assess which nation they would fit in with the best. These included indicating their preference among two paintings and responding to basic questions about their personality (e.g., *'I see myself as someone who is generally reserved'*, responses from 1 = *strongly disagree* to 5 = *strongly agree*). In reality, we disregarded participants' responses to these items and allocated each individual to the Minayzirth nation.

Manipulation of vicarious intergroup exclusion. Participants were presented with the instructions to a Cyberball game, which we adapted to fit the intergroup setting and our aims (see Chapter 3 for further methodological details; Williams et al., 2000; Williams & Jarvis, 2006). These informed participants that Cyberball is a way to train mental visualisation. They were told that they would either be randomly allocated to the role of a player or an observer, and would be connected to other participants online. They were

instructed to, regardless of their role, actively visualise everything happening on the computer screen as vividly as possible, rather than attending to their or others' performance during the ball-tossing game.

In reality, each participant was allocated to the role of the observer and watched a pre-programmed game of Cyberball, with no other participants involved. The game included three players from the Minayzirith nation, represented by blue avatars labelled with the word 'Minay' and the blue Minayzirith flag underneath them, and three players from the Brayzirith nation, represented by green avatars labelled with the word 'Bray' and the green Brayzirith flag underneath them (Figure 5.1). Participants were already familiar with the Minayzirith flag, displayed along their group allocation and descriptions of Minay in earlier parts of the experiment. Participants were randomly allocated to either an inclusion condition ($N = 249$), where both teams received the ball 50% of the time, or to an exclusion condition ($N = 234$), where the Minayzirith team received the ball three times (10%) in the beginning of the game, and was completely excluded from the game by the Brayzirith team afterwards. The game was created using the Cyberball 5 Configuration App (<http://www.empirisoft.com/cyberball.aspx>).

Participants then completed the following measures, in the order that they are presented in. Unless otherwise indicated, all scales were assessed using a 5-point scale (1 = *strongly disagree* to 5 = *strongly agree*). Following these measures, participants were debriefed and thanked for their time.

Manipulation check. In order to assess whether the manipulation of perceived exclusion was successful, we asked participants to respond to the question '*Assuming the ball should be thrown to each person equally (50% of throws to players of each team) what percentage of throws did your national team receive in the Cyberball game?*' ($M = 35.45$, $SD = 21.39$) (Wirth & Williams, 2009). We further created an index measure of perceived

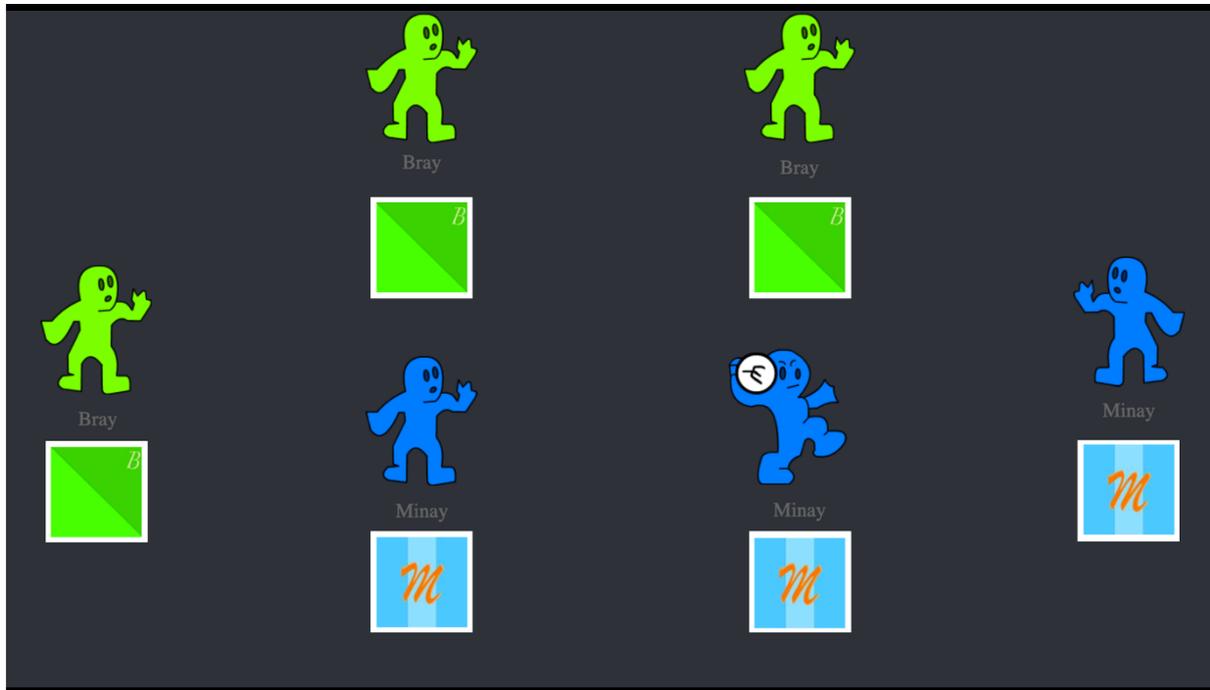
personal exclusion by averaging participants' responses to the statements '*I felt ignored*' and '*I felt excluded*' ($\alpha = .86$, $M = 2.93$, $SD = 1.35$; Wirth & Williams, 2009), and an index measure of perceived group exclusion by averaging participants' responses to the statements '*My group was ignored*' and '*My group was excluded*' ($\alpha = .92$, $M = 2.85$, $SD = 1.46$).

Mood was measured using 7 mood-pairs, asking participants to indicate on a 7-point scale how they felt during the Cyberball game, based on similar measurements employed in previous studies assessing the effects of interpersonal exclusion (Wirth & Williams, 2009). At one end of the scale was one item of the mood-pairs, at the other end the other item. The mood-pairs, bad-good, sad-happy, unfriendly-friendly, tense-relaxed, resentful-contented, angry-pleased, disappointed-satisfied, were presented in a randomized order. An index score was created where higher scores indicate more positive moods ($\alpha = .96$, $M = 4.57$, $SD = 1.59$).

Intergroup hostile intentions were measured with a scale adapted from Mackie, Devos, and Smith (2000). We created a scale containing 10 behaviours, and instructed participants to indicate the extent to which they would engage with each of the behaviours when encountering a member of the Brayzirith nation. Participants indicated the extent to which they would hurt them, harm them, offend them, humiliate them, attack them, threaten them, talk to them in a friendly way, shake hands with them, help them, or take care of them. The items were presented in a randomized order. We reverse scored the positive items, and averaged participants' scores, creating an index score representing intergroup hostile intentions ($\alpha = .89$, $M = 2.09$, $SD = 0.81$).

Figure 5.1

The Cyberball game used in Studies 1a (N = 483), 1b (N = 319), and 2 (N = 73)



5.1.2. Results

The dependent variables, mood and intergroup hostile intentions, were significantly negatively correlated with each other, $r(481) = -.26, p < .001$.

5.1.2.1. Manipulation checks

We first checked that the manipulation of vicarious intergroup exclusion worked as intended. Participants correctly observed a higher percentage of ball throws received by their team during the inclusion condition, while they felt more excluded on a personal and group level in the exclusion condition (Table 5.1). This suggests that the manipulation was successful.

Table 5.1

The Observed Differences on the Manipulation Check Measures Among the Experimental Conditions in Study 1 (N = 483)

Measure	Inclusion: <i>M</i> (<i>SD</i>)	Exclusion: <i>M</i> (<i>SD</i>)	<i>F</i> (1, 464)	η^2
What percentage of the throws did your national team receive in the Cyberball game?	43.11 (16.38)	27.31 (23.06)	76.11***	.14
Personal exclusion	2.47 (1.26)	3.42 (1.27)	66.79***	.12
Group exclusion	2.01 (1.11)	3.74 (1.23)	261.68***	.35

Note. *** $p < .001$. *M* = mean. *SD* = standard deviation.

5.1.2.2. Hypothesis 1a

To test Hypothesis 1a, predicting that vicarious intergroup exclusion would increase intergroup hostile intent, we conducted an independent samples t-test. Levene's test for equality of variances was nonsignificant, suggesting that equal variances can be assumed, $p = .14$. The results of the t-test suggest that participants indicated significantly greater hostile intentions following vicarious intergroup exclusion ($M = 2.34$, $SD = 0.82$) than after observing intergroup inclusion ($M = 1.86$, $SD = 0.74$), $t(481) = 6.91$, $p < .001$, 95% CI [0.35, 0.63]. This result is in line with Hypothesis 1.

5.1.2.3. Hypotheses 2a and 2b

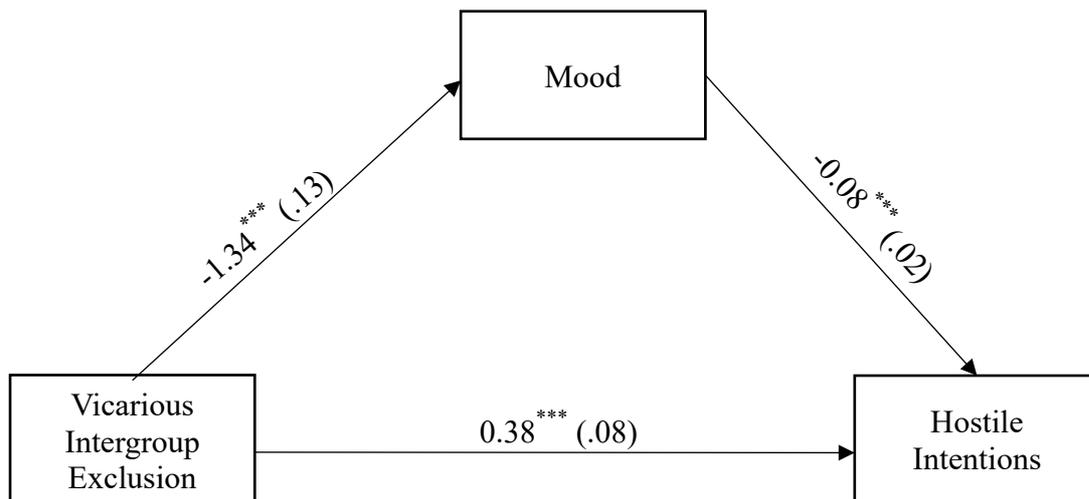
In order to test Hypothesis 2a, predicting that vicarious intergroup exclusion would impair mood, we conducted an independent samples t-test. Levene's test for equality of variances was significant, $p = .008$, suggesting that equal variances cannot be assumed. The results, adjusted for this case with equal variances not assumed, indicate that participants in

the vicarious intergroup exclusion condition reported significantly lower levels of mood ($M = 3.88$, $SD = 1.54$) than those in the intergroup inclusion condition ($M = 5.22$, $SD = 1.34$), $t(462.18) = -10.23$, $p < .001$, 95% CI [-1.60, -1.09]. These results support Hypothesis 2a. We thus proceeded to test Hypothesis 2b, predicting that vicarious intergroup exclusion leads to intergroup hostile intentions indirectly, via mood impairment.

We used Model 4 of PROCESS macro for SPSS (Hayes, 2018). We included the manipulation of vicarious intergroup exclusion as the predictor, mood as the mediator, and hostile intentions as the outcome variable. We asked for 10,000 bootstrapped samples. The overall model was significant, $F(2, 480) = 29.74$, $R^2 = .11$, $p < .001$. The results indicate that vicarious intergroup exclusion predicted mood negatively, 95% CI [-1.60, -1.09], while mood predicted hostile intentions negatively, 95% CI [-0.13, -0.03]. Both the direct, 95% CI [0.23, 0.53], and indirect effects of the experimental manipulation on hostile intentions were significant, 95% CI [0.04, 0.18], $b = .11$, $SE = .04$. These results are in line with Hypothesis 2b (Figure 5.2).

Figure 5.2

The Direct and Indirect Effects of Vicarious Intergroup Exclusion on Intergroup Hostile Intentions in Study 1a (N = 483)



Note. *** $p \leq .001$. Exclusion was coded 1, the control condition 0.

5.2. Study 1b

5.2.1. Method

5.2.1.1. Power analysis

We used the power calculations reported in Study 1a to test Hypotheses 1a and 1b, revealing a necessary sample size of 69, and to test Hypothesis 2, revealing a necessary sample size of 98. We conducted an additional power analysis to determine the sample size necessary to test Hypothesis 3. We conducted the analysis to achieve power = .80 with $\alpha = .05$. We specified an effect size of $r_a = .55$, based on the effects of observed social exclusion on threatened needs (Wesselmann et al., 2009, Study 1), $r_b = .57$ based on the association between control deprivation (i.e., one of the fundamental psychological needs) and aggression following interpersonal social exclusion (Warburton et al., 2006), and $r_c = .12$

between social exclusion and aggression (Chester & Dzierzewski, 2019, Study 1), respectively. We used the MedPower software to run the analysis (Kenny, 2017). The analysis revealed a necessary sample size of 28 participants to test the indirect effect of vicarious intergroup exclusion on aggression via need threat. As we would add the two mediators (i.e., need threat and mood) to the same mediation model, we relied on the more conservative numbers (i.e., $N = 98$ for the indirect effect) as our target sample size.

To calculate the necessary sample size for testing Exploratory Hypothesis 4, we conducted an a priori sample size estimation using G*Power (Faul et al., 2007, 2009). We conducted the analysis for an F test (ANOVA: Fixed effects, special, main effects and interactions) specifying a power = .80, $\alpha = .05$, 4 groups, and denominator $df = 1$. In the absence of previous effect sizes reported in the context of social exclusion, we relied on a medium f effect size of .25 (Cohen, 1969). The analysis revealed a necessary sample size of 128 to test the hypothesis. We conservatively oversampled, ending data collection on a predetermined date.

5.2.1.2. Participants

Four hundred and five participants completed the survey via Amazon MTurk. Participants who took part in Study 1a were not able to complete the survey. We implemented three attention check measures throughout the survey, instructing participants to select a specific option in response to the question (i.e., *Please select Agree*), asking whether their team participated in the Cyberball game, and whether the nation of Minay or Bray held more economic and political power in the Econ-Parliament, based on relevant text presented just before the question. We excluded participants who responded incorrectly to either of these questions ($N = 50$).

Although in Study 1a we described the Cyberball game to participants before they took part in the experiment, and asked them to only continue with the survey if they have no

previous experience, this methodological choice allows participants (completing the game at home online) to conduct a brief online search about the Cyberball game. This may lead them to discover that the purpose of the game is to induce an experience of social exclusion, confounding the observed effects. Here, we thus asked participants about their previous experience with the Cyberball game after they played it. We excluded participants who reported either having played or observed Cyberball previously, or who were unsure whether they played or observed Cyberball previously ($N = 36$). Participants who have previously been debriefed about the procedure know that there are no real players involved in the game, as well as its purposes, and are thus affected differently by the manipulation.

As in Study 1a, we again asked participants to indicate how many times the ball was thrown in total among the players. Five participants reported that the ball was tossed a total of seven or less times among the players. In reality, the ball was tossed 30 times. Such a low answer may indicate that participants were either not paying attention to the game, or that they had technical issues and the game did not run as we intended. However, these are only guesses. Excluding these participants from the analyses did not change the pattern of results, so in order to increase power, we report all further analyses with these data included.

The final sample consisted of 319 participants, 163 females, 150 males, and 6 participants disclosing their gender as 'other'. Participants were between the ages 18 and 68 ($M = 32.52$, $SD = 10.31$). Participants were reimbursed with 1.00 USD for their time.

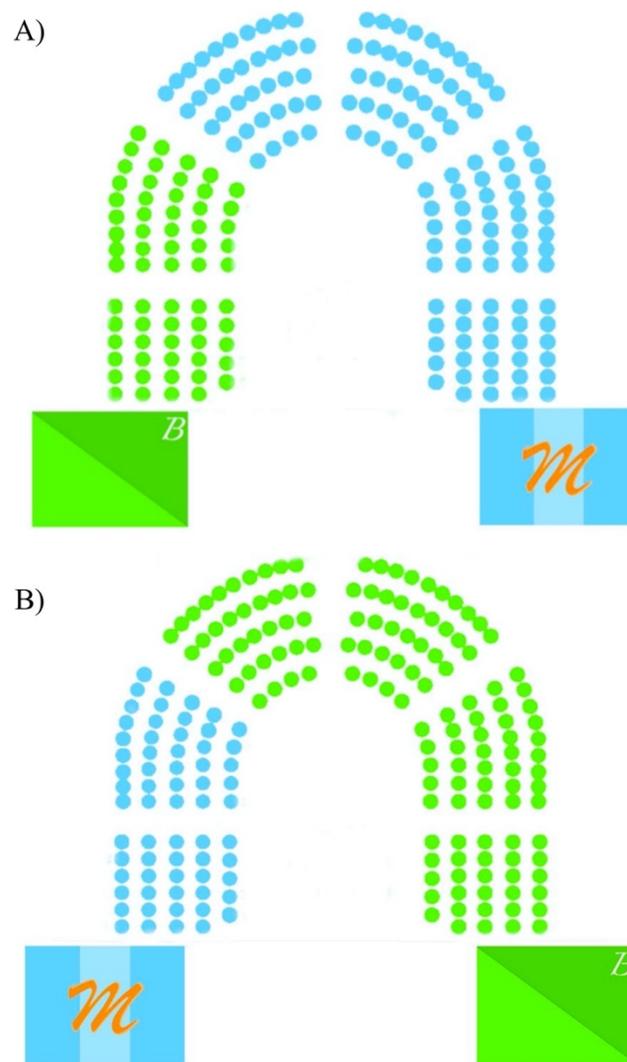
5.2.1.3. Procedure

We created an online questionnaire ostensibly investigating the link between personality and mental visualization using Qualtrics Software. Participants were first presented with an informed consent form. As in Study 1a, we told participants that they would take part in a role-playing game to train their mental visualization abilities (see Chapter 3 for further methodological details).

Identically to Study 1a, participants were assigned the Minayzirith membership based on mock personality measures (Keenan, 2016). In order to manipulate group status, participants then learned the information about the Minayzirith and Brayzirith nations as in Study 1a, however, here we added further details. Participants were randomly allocated to receive information about their ingroup holding a higher or lower political and economic status and power than the neighbouring Brayzirith nation. We introduced the Econ-Parliament, which oversees the trading processes between Minay and Bray. According to their randomly allocated condition, participants learned either that members of Minay's or that members of Bray's Parliament currently hold two-thirds of the seats in the Econ-Parliament, 'due to old laws and traditional privileges', and are thus more likely to get their own agenda across or veto that of the other group. To ensure clarity, we further illustrated how the seats within the Econ-Parliament are distributed (Figure 5.3).

Participants next watched the intergroup Cyberball game (Williams et al., 2000; Williams & Jarvis, 2006), exactly as in Study 1a: They were led to believe that they were randomly allocated to the role of an observer rather than player, and were asked to watch as three members of the Minayzirith nation play the ball-tossing game against three members of the Brayzirith nation (Figure 5.1). They were instructed to imagine the game as if it was happening in real life. In reality, the game was pre-programmed and there were no other participants involved. As in Study 1a, the participants were randomly allocated to either the condition of vicarious intergroup exclusion, where members of the outgroup excluded the ingroup from the game after receiving three throws initially (i.e., 10% out of a total of 30 throws) or a control intergroup inclusion condition, where the two groups received the ball equally. The game was created using the Cyberball 5 Configuration App (<http://www.empirisoft.com/cyberball.aspx>).

The random allocation of participants to conditions of the 2 (status: high ingroup status vs. low ingroup status) x 2 (Cyberball: vicarious intergroup exclusion vs. control inclusion) between-participants design is shown in Table 5.2. Participants completed measures of mood (Wirth & Williams, 2009) and need threat (Jamieson et al., 2010) following the game, in a randomized order, with the items of each scale also randomized. Finally, participants completed the measures of intergroup hostile intentions (Mackie et al., 2000) and aggression (DeWall et al., 2013) in a randomized order, with the items of the hostile intentions scale also randomized. Participants were debriefed and thanked for their time. Ethical approval was granted by the Goldsmiths Ethics Committee.

Figure 5.3*Manipulation of Group Status*

Note. A) The image displayed to participants who were informed that Minay holds more seats in the Econ-Parliament. B) The image displayed to participants who were informed that Bray holds more seats in the Econ-Parliament.

Table 5.2

Random Allocation of Participants Across the Experimental Conditions in Study 1b (N = 319)

	High-Status Ingroup	Low-Status Ingroup	Total
Social Exclusion	<i>N</i> = 79	<i>N</i> = 83	<i>N</i> = 162
Social Inclusion	<i>N</i> = 80	<i>N</i> = 77	<i>N</i> = 157
Total	<i>N</i> = 159	<i>N</i> = 160	<i>N</i> = 319

5.2.1.4. Measures

Unless otherwise indicated, all measures were assessed using a 7-point scale (1 = *completely disagree* to 7 = *completely agree*).

Manipulation check. In order to assess whether the manipulation of perceived exclusion was successful, we asked participants to respond to the question ‘*Assuming the ball should be thrown to each person equally (50% of throws to players of each team) what percentage of throws did your national team receive in the Cyberball game?*’ ($M = 31.98$, $SD = 18.70$), as in Study 1a (Wirth & Williams, 2009). We further created an index measure of perceived personal exclusion by averaging participants’ responses to the statements ‘*I felt ignored*’ and ‘*I felt excluded*’ ($\alpha = .84$, $M = 4.28$, $SD = 1.70$), as in Study 1a (Wirth & Williams, 2009).

Mood was measured by asking participants to indicate the extent to which they experienced the following emotions during the Cyberball game: bad, good, sad, happy, unfriendly, friendly, tense, relaxed, resentful, regret, indignant, angry, scared, threatened, based on previous experiments using similar mood assessments in the context of social exclusion (Wirth & Williams, 2009). We reverse-scored the negative items, and averaged

participants' responses across the scale in a way that higher scores indicated positive mood ($\alpha = .93, M = 4.86, SD = 1.17$).

Need threat was assessed with an adapted version of the need satisfaction scale (Jamieson et al., 2010). We removed items from the original scale that were not applicable in the present version of the game, where participants were allocated to the condition of observer (e.g., *'I felt I was unable to influence the action of others'*, items of the original and revised scales are presented in Appendix B). Although the original need satisfaction scale is comprised of four subscales corresponding to each of the fundamental psychological needs (i.e., self-esteem, need to belong, meaningful existence, control), the validity of these subscales has recently been criticised (Gerber et al., 2017). For this reason, and because we did not use the complete original scale, but only selected items applicable to the conditions of vicarious intergroup exclusion, we did not investigate the role of threat to individual needs here. The items of the scale were presented in a randomized order. We averaged participants responses on the scale, and reversed-scored the items of the original scale in a way that higher scores indicated need threat rather than need satisfaction (e.g., *'I felt meaningless'*; $\alpha = .89, M = 3.47, SD = 0.98$).

Intergroup hostile intentions were measured as in Study 1a (Mackie et al., 2000; $\alpha = .91, M = 2.34, SD = 0.94$).

Intergroup aggression was measured using the voodoo doll task (DeWall et al., 2013). It is a validated measure of symbolic aggression which can be used in a laboratory setting or online. In the present experiment, participants were presented with an image of a voodoo doll (Figure 5.4) along the following instructions:

Some parts of this experiment may have caused you to experience distress. The following task is to help you regulate your emotions.

Research indicates that stabbing pins into a voodoo doll helps people regulate emotions. This doll represents a member of the Bray nation.

Participants were presented with a slider ranging from 0 to 51 and asked to indicate how many pins they would like to stab the doll with. Aggression was measured by the number of pins participants were willing to use ($M = 2.82$, $SD = 6.85$). In order to correct for issues with skewness = 4.35 ($SE = .14$) and kurtosis = 22.61 ($SE = .27$), we added 1 to each participant's number of chosen pins (this way accounting for participants who indicated wanting to stab 0 pins in the doll) and applied a base 10 logarithmic transformation ($M = .30$, $SD = .42$, $skew = 1.38$, $SE_{skew} = .14$, $kurtosis = 1.05$, $SE_{kurtosis} = .27$), in line with previous suggestions (Chester & Dzierzewski, 2019).

Figure 5.4

The Image of the Voodoo Doll Used in Studies 1b (N = 319) and 4 (N = 706)



5.2.2. Results

Correlations among the key variables are presented in Table 5.3. These suggest that mood was negatively related to need threat, intergroup hostile intentions, and aggression. Need threat was positively associated with hostile intentions and aggression, and the latter two variables were also positively correlated.

Table 5.3

Correlations Among Key Variables in Study 1b (N = 319)

	1	2	3
1. Mood	-		
1. Need threat	-.59***	-	
3. Hostile intentions	-.50***	.28***	-
4. Aggression	-.25***	.15**	.35***

Note. *** $p < .001$. ** $p < .01$.

5.2.2.1. Manipulation check

We assessed the effects of the manipulation of vicarious intergroup exclusion on the manipulation check variables. Participants experiencing vicarious intergroup exclusion indicated greater levels of perceived exclusion ($M = 4.93$, $SD = 1.45$) than participants observing intergroup inclusion ($M = 3.61$, $SD = 1.70$), $F(1, 318) = 56.26$, $p < .001$, $\eta^2 = .15$. Those observing intergroup exclusion also indicated that their team received the ball a significantly lower percentage of the time ($M = 20.69$, $SD = 15.15$) than those observing intergroup inclusion ($M = 43.64$, $SD = 14.37$), $F(1, 318) = 192.62$, $p < .001$, $\eta^2 = .38$. These

results suggest that the manipulation of vicarious intergroup exclusion worked in the intended way.

We also included a manipulation check to ensure that the manipulation of group status was clear to all participants. We asked them to indicate whether Minay or Bray has higher economic and political power in the Econ-Parliament, just after presenting participants with relevant information. All participants included in the following analyses understood the manipulation correctly, while those who did not were excluded from all analyses (see Section 5.2.1.2. describing the present sample).

5.2.2.2. Hypothesis 1

To test Hypothesis 1, predicting that vicarious intergroup exclusion would increase intergroup hostile intentions and aggression, we conducted two independent samples t-tests. We entered the manipulation of exclusion as the predictor, and hostile intentions as the outcome in the first analysis. Levene's test for equality of variances was nonsignificant, $p = .09$. The results indicate that hostility was significantly higher in the condition of vicarious intergroup exclusion ($M = 2.53, SD = 0.97$) than in the intergroup inclusion condition ($M = 2.15, SD = 0.88$), $t(317) = -3.62, p < .001, 95\% CI [-0.58, -0.17]$. We entered aggression as the outcome variable in the next analysis. Levene's test for equality of variances was significant, $p = .03$, so we report the results adjusted for the equality of variances not assumed. The results indicate that vicarious intergroup exclusion led to greater aggression ($M = 0.35, SD = 0.44$) than observing intergroup inclusion ($M = 0.25, SD = 0.38$), $t(313.04) = -2.18, p = .03, 95\% CI [-0.19, -0.01]$. Applying a Bonferroni correction reduced the level of significance to $p < .025$. With the adjusted significance value, the analysis on hostility was significant and in line with Hypothesis 1a, while that on aggression became nonsignificant, but nevertheless was in the direction predicted by Hypothesis 1b.

5.2.2.3. Hypotheses 2 and 3

Although the manipulation of vicarious intergroup exclusion did not affect intergroup aggression significantly, such an underlying total effect of the predictor on the outcome is only necessary when testing a mediation (Preacher & Hayes, 2004, 2008). Its presence is not required to test an indirect effect, which can be observed even in the absence of a total effect. We thus proceeded to test Hypotheses 2 and 3 on intergroup aggression as well as intergroup hostile intentions. In order to test Hypothesis 2, predicting that vicarious intergroup exclusion effects intergroup hostile intentions and aggression via impaired mood, and Hypothesis 3, predicting that the same indirect relationship occurs via need threat, we first tested the effects of the manipulation of vicarious intergroup exclusion on mood and need threat.

We conducted two independent samples t-tests. We entered mood as the dependent variable of the first, and the manipulation of vicarious intergroup exclusion as the independent variable. Levene's test for equality of variances was significant, $p = .04$, we thus report the analysis adjusted for the instance where equality of variances is not assumed. Participants reported significantly lower levels of mood following vicarious intergroup exclusion ($M = 4.38$, $SD = 1.13$) than after intergroup inclusion ($M = 5.36$, $SD = 0.99$), $t(314.28) = -8.23$, $p < .001$, 95% CI [-1.21, -0.74]. We next tested the effects of the manipulation of vicarious intergroup exclusion on need threat. Levene's test for equality of variances was nonsignificant, $p = .85$. Participants reported significantly higher levels of need threat following vicarious intergroup exclusion ($M = 3.77$, $SD = 0.92$) than after intergroup inclusion ($M = 3.17$, $SD = 0.96$), $t(317) = 5.68$, $p < .001$, 95% CI [0.39, 0.80]. These results support Hypotheses 2a and 3a.

We next conducted two multiple mediation analyses using Model 4 of PROCESS macro for SPSS (Hayes, 2018). We entered the manipulation of vicarious intergroup exclusion as the predictor, mood and need threat as the competing mediators, and group

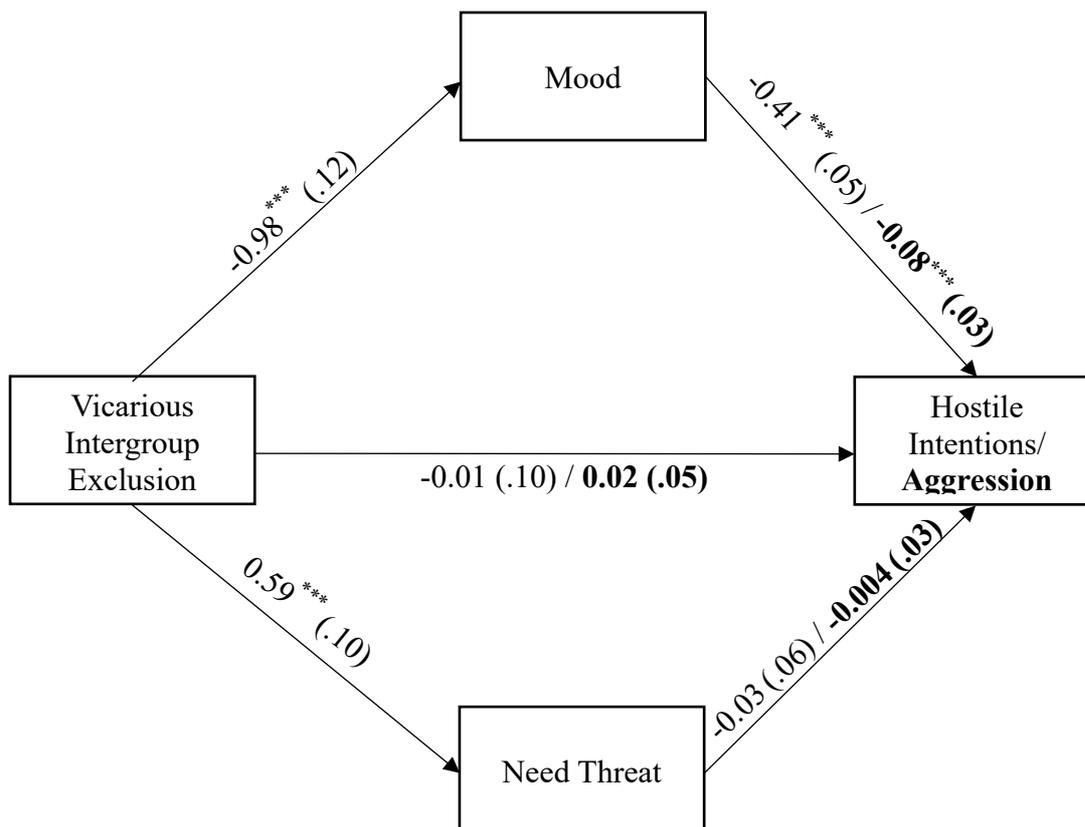
status as a covariate (both analyses revealed the same pattern of results when removing the covariate). We asked for 10,000 bootstrapped samples.

We entered intergroup hostile intentions as the outcome of the first analysis. The overall model was significant, $F(4, 314) = 26.97, R^2 = .26, p < .001$. The effects of the manipulation of vicarious intergroup exclusion on both mood, 95% CI [-1.21, -0.74], and need threat were significant, 95% CI [0.39, 0.80]. The effects of mood on hostile intentions were significant, 95% CI [-0.51, -0.31], while those of need threat were not, 95% CI [-0.14, 0.09]. The direct effect of vicarious intergroup exclusion on hostile intentions was nonsignificant, 95% CI [-0.21, 0.19]. The total indirect effect estimated by the model, $b = 0.38, SE = .07, 95\% CI [0.26, 0.53]$, as well as the indirect effect of the relationship between vicarious intergroup exclusion and intergroup hostile intentions via mood were significant, $b = 0.40, SE = .08, 95\% CI [0.26, 0.56]$, while that via need threat was not, $b = -0.02, SE = .03, 95\% CI [-0.08, 0.05]$ (Figure 5.5).

We next entered aggression as the outcome variable and ran the same model. The overall model was significant, $F(4, 314) = 5.57, R^2 = .07, p < .001$. The effects of mood on aggression were significant, 95% CI [-0.13, -0.03], while those of need threat were not, 95% CI [-0.06, 0.05]. The direct effect of vicarious intergroup exclusion on hostile intentions was nonsignificant, 95% CI [-0.08, 0.12]. The total indirect effect estimated by the model, $b = 0.08, SE = .02, 95\% CI [0.03, 0.13]$, as well as the indirect effect of vicarious intergroup exclusion on intergroup aggression via mood were significant, $b = 0.08, SE = .03, 95\% CI [0.03, 0.14]$, while that via need threat was not, $b = -0.003, SE = .02, 95\% CI [-0.04, 0.03]$ (Figure 5.5). Overall, these results support Hypothesis 2, predicting that mood impairment drives the effects of vicarious intergroup exclusion on intergroup hostile intentions and aggression, and favours it to Hypothesis 3, predicting that increased threat to fundamental psychological needs underlies the same relationship.

Figure 5.5

The Direct and Indirect Effects of Vicarious Intergroup Exclusion on Intergroup Hostile Intentions and Aggression in Study 1b (N = 319)



Note. $***p \leq .001$. Exclusion was coded 1, the control condition 0.

5.2.2.4. Exploratory Hypothesis 4

We next conducted exploratory analyses, testing whether group status and power influence intergroup hostile intentions and aggression following vicarious intergroup exclusion. Specifically, we tested the exploratory prediction that belonging to a low-status, low-power ingroup, whilst ingroup members are excluded by members of a high-status, high-power outgroup intensifies the negative consequences (i.e., impaired mood, increased

intergroup hostility and aggression) related to the observed exclusion. We conducted three 2 x 2 analyses of variance, including the manipulation of group status and that of vicarious intergroup exclusion as the independent variables. We applied a Bonferroni correction to the results of the latter two analyses, assessing intergroup hostile intentions and aggression as the dependent variable, reducing the level of significance to $p < .025$.

In the first analysis, we entered mood as the outcome variable. Levene's test of equality of error variances was significant, $p = .04$. We thus reduced the level of significance to $p < .025$, accounting for the moderate violation (Tabachnick & Fidell, 2007). This way, we could avoid transforming the dependent variable, which may lead to difficulties with interpreting the results of the analyses. The main effect of vicarious intergroup exclusion was significant, indicating that participants reported lower mood following vicarious intergroup exclusion than following intergroup inclusion, as reported above in Section 5.2.2.3, $F(1, 318) = 66.89, p < .001, \eta_p^2 = .18$. The main effects of the status manipulation were nonsignificant, $F(1, 318) = 1.15, p = .28, \eta_p^2 = .004$. The interaction across the two conditions was also nonsignificant, $F(1, 318) = 0.21, p = .65, \eta_p^2 = .001$. These results do not support Hypothesis 4a.

Next, we entered hostile intentions as the outcome variable. Levene's test of equality of error variances was nonsignificant, $p = .23$. The main effect of vicarious intergroup exclusion was significant, indicating that participants reported increased hostile intentions following vicarious intergroup exclusion than following intergroup inclusion, as reported above in Section 5.2.2.2, $F(1, 318) = 10.90, p < .001, \eta_p^2 = .04$. The main effects of the status manipulation were also significant, $F(1, 318) = 4.58, p = .02, \eta_p^2 = .02$. The results revealed that participants holding a low-status, low-power group membership held more hostile intent towards higher-status, high-power outgroup members ($M = 2.46, SE = .07$) than those holding a high-status, high-power group membership towards lower-status, lower-power

outgroup members ($M = 2.22$, $SE = .07$). This effect was present regardless of whether participants observed an episode of intergroup exclusion or inclusion. The interaction across the two conditions, however, was nonsignificant, $F(1, 318) = 0.46$, $p = .46$, $\eta_p^2 = .002$. These results do not support Hypothesis 4b.

We entered aggression as the outcome variable in the final analysis. Levene's test of equality of error variances was nonsignificant, $p = .09$. Given the adjusted level of significance after applying a Bonferroni correction, the main effect of the manipulation of vicarious intergroup exclusion on aggression was nonsignificant, although it was in the anticipated direction, as detailed above in Section 5.2.2.2, $F(1, 318) = 4.59$, $p = .03$, $\eta_p^2 = .01$. The main effect of status on aggression was nonsignificant, $F(1, 318) = 2.54$, $p = .11$, $\eta_p^2 = .01$. The interaction between group status and the manipulation of vicarious intergroup exclusion was nonsignificant, $F(1, 318) = 0.10$, $p = .75$, $\eta_p^2 < .001$. These results indicate that holding a high vs. low group status and power did not influence participants' mood, hostile intentions, or aggressive behaviour following vicarious intergroup exclusion, and thus do not support Exploratory Hypothesis 4.

5.3. Discussion

The effects of merely observing as members of one's ingroup experience social exclusion by members of an outgroup have thus far not been examined in detail. Previous research indicates that such experiences may lead to increased feelings of anger, a personal sense of humiliation, and powerlessness (Veldhuis et al., 2014). It has additionally been related to an increase in aggression towards members of the excluding outgroup (Golec de Zavala, Federico, et al., 2019). The present research went beyond previous findings by clarifying the effects of vicarious intergroup exclusion on novel variables: intergroup hostile intentions, mood, and need threat. It replicated previous results suggesting that vicarious intergroup exclusion leads to increased aggression. Furthermore, we investigated the

mechanism underlying the relationship between vicarious intergroup exclusion and subsequent hostile intentions and aggression, and tested whether group status may further influence these effects.

The results of two studies conducted on independent samples revealed that vicarious social exclusion increases subsequent hostile intentions towards members of the excluding outgroup. The results of Study 1b further indicate an increase in intergroup aggression following vicarious intergroup intentions, but these results did not reach the level of statistical significance. Hostile intentions may precede actual aggressive behaviour (Anderson & Bushman, 2002). The manipulation of vicarious intergroup exclusion used in the present studies clearly had an impact on participants, e.g., evidenced notably by a perception of increased personal exclusion after merely observing the exclusion of ingroup members. Nevertheless, the nature of the exclusion may be considered trivial by some, since it relied on the exclusion of group members from a simple ball-tossing game, rather than a social process influencing real-life outcomes. Thus, in a context which holds stronger implications for the ingroup, it is reasonable to anticipate that the increase in hostile intentions may indeed transform into a significant increase in aggressive behaviour as well. Future research should explore such possibilities.

Vicarious intergroup exclusion further had a negative effect on self-reported measures of mood across both studies. We observed that the observed exclusion affected intergroup hostile intentions indirectly via mood impairment. Furthermore, although the total effect of exclusion on intergroup aggression was nonsignificant, the indirect relationship between these variables became significant through impaired mood. In line with Hypothesis 2, this suggests that observing the ingroup's exclusion impairs mood, which in turn leads to an increase in subsequent retaliatory hostile intent and aggression.

Study 1b compared this indirect effect to that via threat to fundamental psychological needs, a variable that also increased following the exclusion episode. Although the literature has theorized about such an indirect effect existing between exclusion and aggression through threatened needs in the context of interpersonal exclusion (Ren et al., 2018), the data collected here indicates that this relationship indeed occurs via mood impairment instead. Future research should thus take its role into consideration in the interpersonal context as well, and compare it to that of need threat. It should also be noted that here we used a measure of need threat that has been adapted from the need satisfaction scale to fit our experimental setting (Jamieson et al., 2010). Thus, future research should also aim to replicate the present findings using the original scale.

Finally, Study 1b included a manipulation of group status and power. Research indicates that belonging to a high-status, high-power ingroup may hold a protective purpose against the effects of social exclusion, while belonging to a low-status, low-power ingroup may intensify its effects (Schmitt & Branscombe, 2002a, 2002b). Those belonging to a lower status group may experience everyday forms of social exclusion resulting from their group membership more often, and thus be increasingly sensitive to such experiences. The results of the present research do not indicate that status and power interact with the effects of vicarious intergroup exclusion. This finding corresponds to previous work demonstrating that the effects of exclusion are comparable whether experienced as the member of a majority or minority group (Schaafsma & Williams, 2012).

Rather, the data suggest that there may be a different process taking place, in line with previous research indicating an increased sensitivity experienced by low-status group members in intergroup processes (Schmitt & Branscombe, 2002a, 2002b). Although the effects of the status manipulation on mood were negligible, we observed a main effect of group status on intergroup hostile intentions, regardless of the social exclusion or inclusion of

the ingroup. Participants randomly assigned to a low-status, low-power ingroup membership also reported increased levels of aggression towards the outgroup following both vicarious intergroup exclusion and inclusion, though the difference between the aggression of low-status and high-status ingroup members did not reach significance. Thus, it seems like belonging to a high-status ingroup does lead to more adaptive intergroup behaviour, but this was not influenced by additional intergroup processes tested here. Previous research suggests that perceived relative deprivation is related to increased aggression (Greitemeyer & Sagioglou, 2016), potentially driving the effects observed here.

The effects of vicarious intergroup exclusion on mood, need threat, aggression, and even a sense of personal exclusion overlap with those of experiencing social exclusion personally, even though the exclusion in the context investigated here is merely observed. Across two studies, we found support for the prediction that vicarious intergroup exclusion affects intergroup hostile intent and aggression indirectly through mood impairment. Need threat did not play a similar indirect role in this relationship, whilst group status also did not influence the effects of exclusion. In the next chapter, we turn to exploring how the negative consequences of vicarious intergroup exclusion may be alleviated.

Chapter 6.

Study 2: Alleviating the Negative Effects of Vicarious Intergroup Exclusion Using Transcranial Direct Current Stimulation

How can we alleviate the effects of vicarious intergroup exclusion on intergroup hostility and aggression? The results of two independent datasets presented in Study 1 indicate that mood impairment underlies these effects. Fortifying emotional resilience may provide individuals with more adaptive ways of downregulating the negative affect caused by vicarious social exclusion, thus breaking the link between exclusion and hostile intentions and aggression. Study 2 tested this prediction, employing a non-invasive brain stimulation technique.

Two previous experiments used anodal transcranial Direct Current Stimulation (tDCS) as participants experienced interpersonal social exclusion using the original, interpersonal Cyberball paradigm (Riva et al., 2012; Riva, Romero Lauro, DeWall, et al., 2015; Williams et al., 2000). The anodal stimulation targeted the right ventrolateral prefrontal cortex (rVLPFC), aiming to enhance neural activity in this region. The rVLPFC is associated with emotion regulation, the regulation of physical pain, and the downregulation of negative emotions related to threat perception, among others (Morawetz et al., 2017; Tupak et al., 2014; Wager et al., 2008). The results of these studies indicate that tDCS stimulation of the rVLPFC alleviated the negative effects of interpersonal social exclusion (Riva et al., 2012; Riva, Romero Lauro, DeWall, et al., 2015). Participants undergoing tDCS stimulation (vs. sham stimulation) reported similar mood, social pain, and engaged in comparable subsequent aggression to participants in a control condition, who were not experiencing social exclusion. Studies employing cathodal tDCS stimulation of the same region, i.e., stimulation aiming to reduce activity in the target region, found opposite effects, suggesting an increase in negative affect as a consequence (Riva, Romero Lauro, Vergallito, et al., 2015).

Study 2 aimed to closely replicate the methodology used in these experiments. It employed a stimulation of identical strength, applied to the same brain region, the rVLPFC, as participants observed their ingroup members' inclusion or exclusion from a game of Cyberball. The effects of the stimulation were compared to a sham stimulation in order to eliminate potential placebo effects. We predicted that tDCS stimulation of the rVLPFC diminishes the negative effects of vicarious intergroup exclusion (Hypothesis 8). Specifically, we anticipated that participants undergoing tDCS stimulation (vs. sham stimulation) as they observed members of their ingroup being excluded by members of an outgroup would report comparable mood to those in a control condition, not experiencing vicarious intergroup exclusion. We further anticipated that tDCS stimulation (vs. sham stimulation) would lead to intergroup hostile intentions and aggression following vicarious intergroup exclusion comparable to the that exhibited by participants observing the social inclusion of their group. While Study 1 tested Hypotheses 1 and 2a following online data collection, Study 2 additionally aimed to replicate its findings under laboratory conditions, in order to gain further confirmation of the results.

6.1. Method

6.1.1. Power analysis

We used the a priori sample size calculations reported in Study 1 to test Hypothesis 1, revealing that 69 participants are required to conduct the analyses. To calculate the sample size necessary to test Hypothesis 2a, predicting that vicarious intergroup exclusion would lead to impaired mood, we used G*Power (Faul et al., 2007, 2009). We conducted an a priori sample size calculation for a t-test testing the differences between two independent means. We specified the effect size based on a previous experiment reporting the effects of interpersonal social exclusion on mood impairment, $\eta^2 = .35$, along power = .80, and $\alpha = .05$.

We set the allocation ratio of $N2 / N1$ to 1. The analysis revealed a necessary sample size of 14 participants.

We used G*Power (Faul et al., 2007, 2009) to calculate the sample size necessary to test Hypothesis 8, predicting that fortifying emotional resilience would lead to diminished negative consequences of vicarious intergroup exclusion. We conducted the analysis for an ANOVA with fixed effects, special, main effects, and interactions. We specified power = .80 and $\alpha = .05$, four groups and one numerator *df*. We anticipated that the effects of tDCS stimulation would alleviate mood impairment, intergroup hostile intentions, and aggression by fortifying emotion regulation. We thus used the previously reported effect size of the interaction between the tDCS stimulation and interpersonal social exclusion on negative affect of $\eta_p^2 = .10$ (Riva et al., 2012). The analysis revealed a total necessary sample size of 73. We oversampled by 10% to account for potential issues that may arise during the stimulation, aiming to recruit a total of 80 participants.

6.1.2. Participants

Eighty participants were recruited to take part in the experiment via the SONA participation scheme of Goldsmiths, University of London, and advertisements posted across noticeboards of the campus. All participants were reimbursed with course credits or a 10.00 GBP Amazon voucher for their time. All participants met the safety criteria of brain stimulation research, e.g., they had no metal in their bodies; they were suffering from no known psychological or neurological disorders; none of them were taking medication affecting the central nervous system; they had no family history of epilepsy. All participants were between the ages of 18 and 45 in order to ensure homogeneity of brain structure. Following the Cyberball game, as a manipulation check we asked participants whether their team took part in the game. Five participants indicated that their team did not play, suggesting that they either did not pay sufficient attention to the game, or that they did not

understand the minimal group assignment. We excluded these participants from the analyses. We excluded a further two participants from the analyses, as due to a faulty battery in the brain stimulation equipment we were unable to run the complete sessions.

The final sample consisted of 73 participants, 15 males, 57 females, and 1 participant disclosing their gender as 'other'. Participants were between the ages 18 and 45 ($M = 22.58$, $SD = 4.93$).

6.1.3. Procedure

Before arriving to the laboratory, participants completed safety screening forms via e-mail to ensure that they could safely undergo tDCS stimulation. To comply with the safety regulations of tDCS, they were strictly instructed not to consume alcohol or use recreational drugs at least 48 hours prior to arriving to the laboratory, or consume caffeine 1 hour prior to arrival, to remove all piercings from their body before the experiment, to ensure that they had breakfast before the experiment, and to ensure that they had a full nights' sleep (i.e., at least 6 hours) before the experiment. Upon arrival to the laboratory, all participants went through additional verbatim screening by trained brain stimulation experts to ensure the safety of the stimulation. They were informed of any possible side-effects that may arise during or following brain stimulation (e.g., temporary redness of the skin at the placement of the electrodes), and were asked not to drive in the hour after leaving the laboratory. All participants signed an informed consent form and safety screening form.

The experimental manipulation of vicarious intergroup exclusion was identical to that used in Study 1a (see also Chapter 3). We told participants that they would take part in a role-playing game to train their mental visualization abilities. As in Study 1a, they were assigned the Minayzirith membership based on mock personality measures (Keenan, 2016). After learning some information about the lands of Minay and Bray, participants completed a 20-item Stroop task (Stroop, 1935), ostensibly to measure cognitive abilities. In reality, this was

included as a manipulation check measure, assessing the effects of brain stimulation. The experiment was conducted using a fully between-participants design. Thus, we included the Stroop task as a within-participants measure, allowing us to compare participants' baseline performance pre-stimulation against their own post-stimulation scores. This way, we were able to assess any differences in the changes in the performance of those undergoing tDCS stimulation and compare them to changes in the performance of those undergoing sham stimulation. We chose the Stroop task for this purpose as previous research indicates a relationship between cognitive control and emotion regulation, and relates both processes to the lateral prefrontal cortex (Goldin et al., 2008; Green & Malhi, 2006). In line with this, we anticipated participants to exhibit enhanced performance on the Stroop task following anodal tDCS stimulation of the rVLPFC compared to their own baseline performance. An improvement was also anticipated in those undergoing sham stimulation due to practice effects, however, we expected improvements in this group to be lower.

Throughout the next 20-minutes, participants underwent either tDCS stimulation or sham stimulation using a DC-Stimulator (NeuroConn GmbH, Germany), detailed below in Section 6.1.4. The sham condition was introduced to account for any confounding placebo effects arising from the stimulation. The duration of the sham stimulation allowed participants to experience a tingling sensation under the electrodes, ensuring that they believed they were undergoing real stimulation, but it was short enough that it could not result in any real effects on brain activity (Riva et al., 2012; Riva, Romero Lauro, DeWall, et al., 2015). Participants sat still and waited for 15 minutes as they received the (sham or tDCS) stimulation, while the computer screen read 'Pausing for stimulation'. In the final 5-minutes of the stimulation, they were asked to continue with the computer survey, based on the methods used by Riva and colleagues (2012, 2015).

Upon continuing the survey, participants were presented with the instructions of the Cyberball game (Williams et al., 2000; Williams & Jarvis, 2006), as in Study 1. All participants were still receiving (tDCS or sham) stimulation during the experimental manipulation of vicarious intergroup exclusion, which lasted for approximately 90 seconds. It is unclear how long the effects of the stimulation would last for exactly, and using online stimulation during the exclusion manipulation ensured that any effects were present at the desired section of the experiment.

As in Study 1, participants were led to believe that they were randomly allocated to the role of an observer rather than player, and were asked to watch as three members of the Minayzirith nation played the ball-tossing game against three members of the Brayzirith nation (Figure 5.1). They were instructed to imagine the game as if it was happening in real life. In reality, the game was pre-programmed and there were no other participants involved. The games were created with the Cyberball 5 Configuration App (<http://www.empirisoft.com/cyberball.aspx>). Participants were randomly allocated to either the condition of vicarious intergroup exclusion, where members of the outgroup excluded the ingroup from the game after receiving 3 throws initially (10% out of a total of 30 throws) or a control social inclusion condition, where the two groups received the ball equally. The random allocation of participants to conditions of the 2 (stimulation: sham vs. tDCS) x 2 (Cyberball: vicarious intergroup exclusion vs. vicarious intergroup inclusion) between-participants design is shown in Table 6.1.

Participants next completed manipulation check measures assessing whether the conditions of vicarious intergroup exclusion produced the desired effects. They were then presented with measures of mood (Wirth & Williams, 2009), intergroup hostile intentions, (Mackie et al., 2000), and aggression (DeWall et al., 2013). Finally, participants completed

the second block of the Stroop task (Stroop, 1935), presenting 20 novel items in a randomized order. All participants were debriefed.

An experimenter was present throughout each session, in order to ensure the safety of participants. The experimenter sat in a far corner of the room in order to minimize any distractions to participants. For the sake of safety, a first aid trained tDCS expert was also available in the room next to where testing took place. Ethical approval was granted by the Goldsmiths Ethics Committee.

6.1.4. Transcranial Direct Current Stimulation

TDCS uses a weak, electric current to modulate activity in a desired brain region (Nitsche & Paulus, 2011; Woods et al., 2016). Traditionally, two electrodes are placed on the scalp; one target electrode and one reference electrode. Less often, the reference electrode is placed on another part of the body (e.g., the upper arm), while some montages use five electrodes during stimulation. The stimulation allows current to flow between the electrodes through the brain. During anodal stimulation, the target electrode is placed over a selected brain region where one directly wishes to enhance activity, whereas cathodal stimulation may momentarily inhibit or disrupt activity in the selected region. While tDCS is not suitable for the stimulation of regions lying deep in the brain, it can be used flexibly across regions close to the cortex. It is a non-invasive and relatively cost effective technique, and is now routinely used in neuroscientific research as well as in clinical settings. Sham stimulation is often used as a control condition to account for any potential placebo effects arising as a consequence of the brain stimulation. During sham stimulation, participants experience actual tDCS stimulation for only a short duration (e.g., under one minute), which does not have any effects on neural activity. This duration, however, induces the tingling sensation associated with tDCS, ensuring that it provides a realistic comparison. For the remainder of the sham

stimulation, the machine does not apply electric current, while participants are led to believe that it does.

Study 2 used an identical montage to that used in previous research indicating that tDCS stimulation during interpersonal social exclusion alleviates the negative affect and aggression experienced subsequently, aiming to replicate the previously employed procedure as closely as possible (Riva et al., 2012; Riva, Romero Lauro, DeWall, et al., 2015). We placed the saline-soaked anodal electrode over the rVLPFC (area F6, MNI coordinates: 58, 30, 8), and the saline-soaked reference electrode on the contralateral supraorbital area. The electrodes were both 25 cm². The orientation of the electrodes was kept constant across participants (Figure 6.1). As proposed by Riva and colleagues, we used a 1.5 mA current for the total duration of 20 minutes with a fade-in time of 8 seconds and a fade-out time of 5 seconds in the tDCS stimulation conditions. We used the same parameters with a 30 second stimulation duration in the sham condition. Participants were asked to indicate if they were experiencing pain or any discomfort during the stimulation. An experimenter was present at all time during the experimental sessions, while a first-aid trained brain stimulation expert was also nearby during all sessions to ensure participants' physical safety.

Figure 6.1

The Placement of the Target Electrode (Red) Over the rVLPFC and the Reference Electrode (Blue) Over the Contralateral Supraorbital Area in Study 2 (N = 73)



Table 6.1*Random Allocation of Participants Across the Experimental Conditions in Study 2 (N = 73)*

	Sham	tDCS	Total
Social Exclusion	<i>N</i> = 18	<i>N</i> = 20	<i>N</i> = 38
Social Inclusion	<i>N</i> = 19	<i>N</i> = 16	<i>N</i> = 35
Total	<i>N</i> = 37	<i>N</i> = 36	<i>N</i> = 73

6.1.5. Measures

Unless otherwise indicated, all measures were assessed using a 5-point scale (1 = *completely disagree*, 5 = *completely agree*).

Manipulation checks

Vicarious Intergroup Exclusion. In order to assess whether the manipulation of perceived exclusion was successful, we asked participants to respond to the question ‘*Assuming the ball should be thrown to each person equally (50% of throws to players of each team) what percentage of throws did your national team receive in the Cyberball game?*’ ($M = 34.85$, $SD = 16.84$), as in Study 1 (Wirth & Williams, 2009). We further created an index measure of perceived personal exclusion by averaging participants’ responses to the statements ‘*I felt ignored*’ and ‘*I felt excluded*’ ($\alpha = .84$, $M = 2.72$, $SD = 1.05$), and an index measure of perceived group exclusion by averaging participants’ responses to the statements ‘*My group was excluded*’ and ‘*My group was ignored*’ ($\alpha = .93$, $M = 2.74$, $SD = 1.27$), as in Study 1 (Wirth & Williams, 2009).

TDCS Stimulation. The Stroop task (Stroop, 1935) was introduced here to confirm the effects of the tDCS stimulation. We created two versions, each containing 20 items.

These showed a colour word, presented in a font of a different colour (e.g., the word ‘green’

spelled out using yellow letters). Participants were instructed to indicate the colour of the font as quickly and accurately as possible. Participants had a choice of four different colour words in each round. These always contained the word spelled out on the screen, the colour of the font it was written with, and two additional random colours, all presented in a randomized order. Participants exhibited a ceiling effect with their accuracy at both T1 ($M = 18.96$ out of maximum 20 with each correct answer coded 1, $SD = 0.26$) and T2 ($M = 18.81$ out of maximum 20, $SD = 0.78$). We thus relied on their reaction times throughout the analyses presented here (T1: $M = 2.31$ seconds, $SD = 0.69$ seconds, T2: $M = 2.02$ seconds, $SD = 0.94$). We created index scores of each participants' time improvements by subtracting their T2 mean reaction times from their T1 mean reactions times ($M = 0.29$ seconds, $SD = 0.65$ seconds).

Mood was measured using four mood-pairs, asking participants to indicate on a 7-point scale how they felt during the Cyberball game. At one end of the scale was one item of the mood-pairs, at the other end the other item. The mood-pairs were bad-good, sad-happy, unfriendly-friendly, tense-relaxed, based on previous studies assessing mood in a similar manner following the manipulation of social exclusion (Wirth & Williams, 2009). An index score was created by averaging the responses, where higher scores indicated more positive moods ($\alpha = .85$, $M = 4.58$, $SD = 1.27$).

Intergroup hostile intentions were measured as in Study 1 (Mackie et al., 2000; $\alpha = .86$, $M = 1.72$, $SD = 0.56$).

Intergroup aggression was measured as in Study 1b, using the voodoo doll task (DeWall et al., 2013). However, participants were provided with a real voodoo doll along 51 pins to stab it with (Figure 6.2). The instructions were identical to those in Study 1b. They informed participants that stabbing the doll may help them regulate their emotions and asked them to imagine that the doll represents a member of the Brayzirith nation. As in the online

version of this task used in Study 1b, aggression was measured by the number of pins participants used to stab the doll ($M = 2.10$, $SD = 3.59$). In order to correct for issues with skewness = 2.24 ($SE = .28$) and kurtosis = 4.80 ($SE = .56$), we added 1 to each participants number of chosen pins (this way accounting for participants who indicated wanting to stab 0 pins in the doll) and applied a base 10 logarithmic transformation ($M = 0.30$, $SD = 0.38$, $skew = 0.97$, $SE_{skew} = 0.28$, $kurtosis = -0.30$, $SE_{kurtosis} = 0.56$), in line with previous suggestions (Chester & Dzierzewski, 2019).

Figure 6.2

The Voodoo Doll and Pins Used in Study 2 (N = 73)



6.2. Results

We observed no significant correlations among the key dependent variables, although hostile intentions and aggression were positively related to each other, and negatively related to mood (Table 6.2).

Table 6.2

Correlations Among Key Variables in Study 2 (N = 73)

	1	2
1. Mood	-	
2. Hostile intentions	-.20	-
3. Aggression	-.05	.17

6.2.1. Manipulation check

Vicarious intergroup exclusion. Participants correctly observed a higher percentage of ball throws received by their team during the vicarious intergroup inclusion condition, while they felt more excluded during the vicarious intergroup exclusion condition on the personal and group level (Table 6.3). This suggests that our manipulation of vicarious intergroup exclusion worked in the intended way.

TDCS stimulation. Participants completed a version of the Stroop task (Stroop, 1935) before and after tDCS or sham stimulation. We compared T1 reaction times to ensure that potential sampling error did not influence baseline reaction times across the groups. We also compared the differences in reaction time from before to after the stimulation among the groups receiving sham and tDCS stimulation. We anticipated all participants to have lower reaction times at the second assessment, due to practice effects. However, we expected the

stimulation (compared to sham) to increase performance significantly more due to the enhancement of activity in the rVLPFC, a brain region related to cognitive control (Goldin et al., 2008; Green & Malhi, 2006). Participants undergoing tDCS ($M = 2.32$ seconds, $SD = 0.78$ seconds) and sham stimulation ($M = 2.29$ seconds, $SD = 0.60$ seconds) did not differ in their T1 reaction times, $F(1, 72) = .04, p = .84, \eta^2 = .001$. However, those in the sham condition exhibited a greater difference between their T1 and T2 reaction times ($M = 0.43$ seconds, $SD = 0.38$ seconds), than those in the tDCS stimulation condition ($M = 0.14$ seconds, $SD = 0.81$ seconds), suggesting an overall greater improvement in reaction times, $F(1, 72) = 3.86, p = .05, \eta^2 = .05$. This finding is not in line with our expectations. It implies that the stimulation of the rVLPFC impaired cognitive control.

Table 6.3

The Observed Differences on the Manipulation Check Measures Among the Conditions of Vicarious Intergroup Exclusion vs. Control Social Inclusion in Study 2 (N = 73)

Measure	Inclusion: M (SD)	Exclusion: M (SD)	$F(1, 72)$	η^2
What percentage of the throws did your national team receive in the Cyberball game?	45.07 (15.16)	25.45 (12.29)	37.14***	.34
Perceived personal exclusion	2.41 (0.95)	3.00 (1.08)	6.02*	.08
Perceived group exclusion	1.99 (0.90)	3.00 (1.08)	34.87***	.33

Note. *** $p < .001$. * $p < .05$. M = mean. SD = standard deviation.

6.2.2. Hypotheses 1 and 2a

In order to test Hypotheses 1 and 2a, we conducted three separate independent samples t-tests. The manipulation of vicarious intergroup exclusion was entered as the independent variables in each of them. To test Hypothesis 1, predicting that vicarious intergroup exclusion increases intergroup hostile intentions and aggression, we applied a Bonferroni correction, lowering the level of significance to $p < .025$. Levene's test for equality of error variances was nonsignificant in the case of hostile intentions, $p = .58$, and intergroup aggression, $p = .77$. The results revealed that participants in the condition of vicarious intergroup exclusion ($M = 1.74$, $SD = 0.59$) did not indicate significantly different levels of hostile intentions to participants observing intergroup inclusion ($M = 1.69$, $SD = 0.54$), $t(71) = -0.36$, $p = .72$, 95% CI [-0.31, 0.22]. Participants in the condition of vicarious intergroup exclusion ($M = 0.32$, $SD = 0.37$) also did not engage in significantly different levels of intergroup aggression than participants observing intergroup inclusion ($M = 0.28$, $SD = 0.38$), $t(71) = -0.44$, $p = .66$, 95% CI [-0.22, 0.14]. These results do not support Hypothesis 1.

Entering mood as the outcome variable, Levene's test for equality of error variances was significant, $p < .001$. We thus report the results adjusted for such condition. The independent samples t-test suggests that participants in the condition of vicarious social exclusion reported significantly lower levels of mood ($M = 4.14$, $SD = 1.47$) than those in the social inclusion condition ($M = 5.06$, $SD = 0.79$), $t(57.61) = 3.34$, $p = .001$, 95% CI [0.37, 1.46]. These results are in line with Hypothesis 2a.

6.2.3. Hypothesis 8

We conducted three 2 x 2 analyses of variance to test Hypothesis 8, predicting that fortifying emotion regulation would alleviate the negative effects of vicarious intergroup exclusion. We added the manipulation of vicarious intergroup exclusion (vs. social inclusion) as the first predictor to each, and tDCS stimulation (vs. sham stimulation) as the second

predictor. We entered mood as the outcome variable of the first analysis. Levene's test of equality of error variances was significant, $p = .002$. Due to the severe violation, we thus reduced the level of significance to $p < .01$ following the recommendations of Tabachnick and Fidell, as transforming the dependent variable may hinder the interpretation of the results (2007). The main effect of the manipulation of vicarious intergroup exclusion was significant, suggesting that those in the condition of vicarious intergroup exclusion reported significantly lower levels of mood than those in the condition of vicarious intergroup inclusion, $F(1, 72) = 10.22, p = .002, \eta^2 = .13$, as detailed in Section 6.2.2. The main effect of brain stimulation, $F(1, 72) = 0.04, p = .84, \eta^2 = .001$, as well as the interaction between the manipulation of exclusion and brain stimulation were nonsignificant, $F(1, 72) = 0.001, p = .97, \eta^2 < .001$.

We next conducted the same analysis, first entering intergroup hostile intentions, then intergroup aggression as the outcome variables. We applied a Bonferroni correction, reducing the level of significance to $p < .025$. In the case of intergroup hostile intentions, Levene's test of equality of error variances was nonsignificant, $p = .77$. The main effect of the manipulation of intergroup exclusion on intergroup hostile intentions was nonsignificant, $F(1, 72) = 0.05, p = .83, \eta^2 = .001$, as detailed in Section 6.2.2. Participants undergoing tDCS stimulation reported higher levels of hostile intentions ($M = 1.86, SE = 0.09$) than those receiving sham stimulation ($M = 1.59, SE = 0.09$), contrary to the predicted direction, however the difference between these values did not reach statistical significance after applying the Bonferroni correction, $F(1, 72) = 4.32, p = .04, \eta^2 = .06$. The interaction between the manipulation of exclusion and brain stimulation was nonsignificant, $F(1, 72) = 0.37, p = .54, \eta^2 = .01$.

Entering intergroup aggression to the analysis as the dependent variable, Levene's test of equality of error variances was nonsignificant, $p = .82$. The main effect of the

manipulation of intergroup exclusion on intergroup aggression was nonsignificant, $F(1, 72) = 0.20, p = .66, \eta^2 = .001$, as detailed in Section 6.2.2. The main effect of brain stimulation, $F(1, 72) = 0.05, p = .82, \eta^2 = .001$, as well as the interaction between the manipulation of exclusion and brain stimulation were also nonsignificant, $F(1, 72) = 0.004, p = .95, \eta^2 < .001$. These results do not support Hypothesis 8.

6.3. Discussion

Study 2 tested an intervention using non-invasive brain stimulation aiming to alleviate the negative consequences of vicarious intergroup exclusion. The tDCS stimulation was anticipated to increase the activity in the rVLPFC, a brain region related to emotional resilience and the regulation of negative affect (Vergallito et al., 2018). Specifically, we tested the predictions (Hypothesis 1) that vicarious intergroup exclusion leads to an increase in intergroup hostile intentions and aggression, (Hypothesis 2a) as well as impaired mood. We further predicted (Hypothesis 8) that those undergoing the stimulation would report diminished mood impairment and reduced intergroup hostile intentions, and exhibit reduced levels of intergroup aggression following vicarious intergroup exclusion.

Although Study 2 supported the prediction (Hypothesis 2a) that vicarious intergroup exclusion impairs mood, no significant differences were observed in self-reported hostile intentions or aggressive behaviour between the vicarious intergroup exclusion and inclusion conditions (Hypothesis 1). This contradicts the results of Study 1. However, as the results observed in two independent samples in Study 1 suggest that mood impairment may be the catalyst for intergroup hostility and aggression following vicarious intergroup exclusion, these results may be due to procedural differences, rather than a true absence of the effects. A number of reasons may account for the discrepancy, including social desirability, sampling error, and a different operationalization of aggression.

Crucially, unlike Study 1, Study 2 was conducted under laboratory conditions. An experimenter was present at all times during the sessions, in order to ensure that the participants did not experience discomfort, pain, or any unexpected physical sensations during or after the stimulation. The lack of effects on the hostile intentions and aggression measures may be caused by unanticipated social desirability effects. We aimed to minimise the distraction caused by the presence of the experimenter. Yet it is possible that participants refrained from indicating hostile intentions and from stabbing pins in the voodoo doll because in the presence of another individual they were increasingly attentive to social norms relating to hostility and aggression. Future laboratory studies should account for this by ensuring that participants complete aggression measures in a room where no one else is present.

It is also possible that the sample recruited for Study 2 had special characteristics that are not generalizable to the population. The sample was made up of university students, with a large proportion of students enrolled in a psychology degree. The students signing up to take part in the experiment likely had participated in other experiments taking place on campus as well in return for monetary rewards or course credits, resulting in considerable background knowledge on the nature of psychological experiments. They may have been more critical with regards to the aims of the study, as well as its methodology, due to their education in psychological research methods. The replication of the present experiment with a more representative sample would be desirable in the future.

Study 2 also employed a slightly different measure of intergroup aggression than Study 1. Both used the voodoo doll task (DeWall et al., 2013), in which participants are instructed to stab a voodoo doll representing a member of the excluding outgroup. This task has been validated both for laboratory and online use. While in the online version of the task participants indicate the number of pins they wish to stab the doll with using a slider, in the laboratory they receive a doll along pins and directly stab the doll with the desired number of

pins. The action of stabbing a real doll may have a different underlying mechanism to simply indicating the number of pins one would stab into a virtual doll. However, as the hostile intentions measure was also affected differently by the manipulation than in Study 1, the effects of social desirability or sampling error are more likely to be responsible for the observed results.

Study 2 followed the procedure of previous experiments reporting beneficial effects of tDCS stimulation of the rVLPFC on mood impairment and increased aggression in the context of interpersonal social exclusion (Riva et al., 2012; Riva, Romero Lauro, DeWall, et al., 2015), here using an intergroup setting. Participants received tDCS or sham stimulation as they observed members of their ingroup being excluded by members of an outgroup during a game of Cyberball (Williams et al., 2000; Williams & Jarvis, 2006), or as they observed members of their ingroup being included by an outgroup in a game of Cyberball. However, the effects of brain stimulation were not in line with our hypotheses. Brain stimulation did not alleviate the mood impairment related to vicarious intergroup exclusion, while tDCS stimulation had no effect on intergroup hostility or aggression. In fact, the effects of brain stimulation seemed to be in the opposite direction from what we anticipated on our manipulation check measure and on the measure of hostile intentions.

We included the Stroop task as a manipulation check on the effects of tDCS stimulation vs. sham stimulation (Stroop, 1935). The Stroop task was included as a within-participants measure, allowing us to compare participants' own performance before and after the stimulation. We anticipated that tDCS stimulation of the rVLPFC would increase participants' performance on the task, due to the association between the rVLPFC and cognitive control (Goldin et al., 2008; Green & Malhi, 2006). However, contrary to our expectations, stimulation of the rVLPFC impaired performance on the Stroop task compared to sham stimulation. Moreover, the expected effects of anodal tDCS stimulation were not

observed in the present experiment. On the contrary, we observed a main effect of anodal tDCS stimulation increasing participants' self-reported hostile intentions towards members of an outgroup following a game of Cyberball, whether members of their ingroup were excluded from the Cyberball game or not, although this effect did not reach statistical significance.

Although the measure of aggression employed here was different from those used in previous experiments (Riva et al., 2012; Riva, Romero Lauro, DeWall, et al., 2015), this finding is unexpected. Our method of stimulation replicated exactly that used in previous studies (Riva et al., 2012; Riva, Romero Lauro, DeWall, et al., 2015), apart from our use of two 25 cm² electrodes, compared to a 25 cm² target electrode and a 35 cm² reference electrode used previously. Using electrodes of different sizes over the target and control regions has been shown to increase the electric current underneath the target electrode (Nitsche et al., 2008). This difference in electrode size thus may have influenced our effects slightly, but it is unlikely to be responsible for completely changing the direction of the expected results.

Indeed, our results seem to suggest that rather than inducing cortical excitability, we actually inhibited activity in the rVLPFC, despite our aims, suggested by the observed opposite effects to the predicted effects. Alternatively, it is also possible that we induced elevated activity in not only the rVLPFC, but also in surrounding brain regions, thus confounding our results. TDCS is a relatively novel method used routinely in neuroscientific research, and there is cumulating evidence suggesting that there are still gaps in our understanding of this technique. These gaps relate to, for example, understanding the effects of sham stimulation or the way that hair thickness or cortical thickness may affect the electric current reaching the cortex, resulting in lower than desired replicability (Berker et al., 2013; Fonteneau et al., 2019; Héroux et al., 2017; Horvath et al., 2014; Riggall et al., 2015). Thus, we cannot be certain what exactly underlies the results observed here. Likely, further research

on the effects of tDCS, and a greater understanding of its exact mechanisms in the future will contribute to clarifying these results.

Study 2 did not provide support for Hypothesis 8. Because of the unexpected effects of the brain stimulation, it is unlikely that the stimulation increased emotional resilience in the desired manner. Thus, the analyses presented here may not be adequate for addressing the prediction that fortifying emotion regulation would alleviate the negative consequences of exclusion. In Study 4 (Chapter 8) we aim to address this limitation by introducing an intervention designed to fortify emotional resilience based on different principles, employing mindfulness meditation training.

Another limitation of Studies 1 and 2 is that both were conducted in the context of imaginary groups. It is unclear whether the results would generalize across different intergroup contexts, or whether they may even become more pronounced in the context of existing groups. An existing identification with the ingroup may be stronger than that created by a minimal group paradigm, increasing the effects of exclusion (Wirth & Williams, 2009). The remainder of the studies presented in this thesis address this limitation by creating the intergroup context using existing, national groups.

Chapter 7.

Study 3: The Effects of Vicarious Intergroup Exclusion in an Existing Intergroup Setting

The aim of Study 3 was to investigate the effects of vicarious intergroup exclusion in the context of existing national groups, rather than imaginary groups. Besides testing the main hypotheses in this context (Hypotheses 1 and 2), Study 3 additionally aimed to further clarify the conditions that may influence the effects of vicarious intergroup exclusion. Specifically, it investigated the moderating role of ingroup positivity (Hypothesis 5 and Exploratory Hypothesis 6) and whether the hostile intentions and aggression following exclusion differ when they are retaliatory or displaced (Exploratory Hypothesis 7).

People readily take on arbitrary group memberships assigned to them based on trivial factors, and identify with minimal groups (Tajfel & Forgas, 1981). In fact, employing a minimal group paradigm to study intergroup behaviour holds advantages, as it controls for any pre-existing associations with the intergroup context. However, it is possible that existing identification with the ingroup influences the effects of vicarious intergroup exclusion. Indeed, a previous experiment found that the effects of social exclusion intensified when it was due to one's permanent, rather than temporary group membership (Wirth & Williams, 2009).

Study 3 investigated the effects of vicarious intergroup exclusion among US participants, who observed as members of their national group were excluded from a game of Cyberball by British players. The British outgroup is perceived favourably by Americans (McCarthy, 2020), and was chosen here to ensure that negative intergroup attitudes don't confound the results of the present experiment. Study 3 aimed to test the predictions (Hypothesis 1) that vicarious intergroup exclusion leads to increased intergroup hostile intentions, aggression, and (Hypothesis 2a) impaired mood in this novel intergroup context. It

also tested the predictions (Hypotheses 2b) that impaired mood drives the relationship between exclusion and intergroup hostile intentions and (Hypothesis 2c) aggression.

Study 3 also went beyond Studies 1 and 2 by testing novel hypotheses, exploring the moderators and consequences of vicarious intergroup exclusion further. Collective narcissism refers to a belief that the ingroup is exceptional, yet it is characterized by resentment towards a lack of recognition and privileged treatment, as well as hypersensitivity to any perceived threats to the ingroup's image (Golec de Zavala, Dyduch-Hazar, et al., 2019; Golec de Zavala et al., 2009; Golec de Zavala & Lantos, 2020). It is characterized by intergroup hostility when the ingroup's image is threatened (Golec de Zavala, Cichocka, & Iskra-Golec, 2013; Golec de Zavala et al., 2016). Previous data suggests that following interpersonal social exclusion, those high in trait narcissism exhibit increased emotional distress, indicated by neural activity observed using neuroimaging techniques, as well as increased levels of subsequent aggression (Cascio et al., 2015; Chester & DeWall, 2016a; Twenge & Campbell, 2003). Collective narcissism uniquely predicts intergroup behaviour, which is often analogous to that exhibited by individuals high in trait narcissism in the interpersonal context (Golec de Zavala, Dyduch-Hazar, et al., 2019). It is thus reasonable to anticipate that individuals holding collective narcissistic beliefs may respond to vicarious intergroup exclusion with increased intergroup hostile intentions and aggression.

Moreover, a recent experiment used a similar manipulation of vicarious intergroup exclusion in the context of collective narcissism and aggression to that employed here (Golec de Zavala, Federico, et al., 2019). The results of that experiment indicate that vicarious intergroup exclusion led to a decrease in state self-esteem. This decrease in state self-esteem predicted intergroup aggression. The effects of state self-esteem on aggression were mediated by collective narcissism, but only when ingroup satisfaction was controlled for. Ingroup satisfaction refers to feelings of pride and happiness towards being the member of a group,

and unlike collective narcissism, it is noncontingent upon external recognition (Leach et al., 2008). Collective narcissism and ingroup satisfaction tend to show a positive correlation across studies, yet they predict opposite intergroup behaviours independently (Dyduch-Hazar et al., 2019; Golec de Zavala, 2019; Golec de Zavala, Dyduch-Hazar, et al., 2019; Golec de Zavala, Federico, et al., 2019). Thus, we predicted (Hypothesis 5) that collective narcissism would lead to greater intergroup hostile intentions and aggression following vicarious intergroup exclusion, whilst controlling for the effects of ingroup satisfaction.

In an exploratory manner, we tested whether such an effect is unique to antagonistic ingroup positivity, or whether it may generalize across other forms of ingroup positivity as well. Even though ingroup satisfaction is indicative of a secure form of ingroup attachment (Golec de Zavala, Dyduch-Hazar, et al., 2019; Leach et al., 2008), those holding higher levels of ingroup satisfaction may also be affected particularly sensitively by vicarious intergroup exclusion, specifically because of their strong attachment. To clarify this, we tested the exploratory prediction that (Exploratory Hypothesis 6) ingroup satisfaction would lead to greater intergroup hostile intentions and aggression following vicarious intergroup exclusion, whilst controlling for its overlap with collective narcissism.

Study 3 also tested whether the intergroup hostile intentions and aggression following vicarious intergroup exclusion are retaliatory in nature or may also be displaced. Previous literature indicates that interpersonal social exclusion may lead to not only retaliatory, but also displaced aggression (Rajchert et al., 2017; Twenge et al., 2001; Twenge & Campbell, 2003). However, previous studies involved *only* the opportunity to engage in displaced, but not retaliatory aggression (or vice versa). Thus, while it is likely that vicarious intergroup exclusion leads to both displaced and retaliatory hostility and aggression, it is unclear whether participants may engage in greater retaliatory than displaced aggression following social exclusion.

Further research suggests that only provoked, but not nonprovoked aggression is related to actual hedonic pleasure, which may in turn contribute to mood repair (Chester & DeWall, 2016b; Ramírez et al., 2005). The results of Studies 1 and 2 suggest that mood impairment drives the relationship between vicarious intergroup exclusion and intergroup hostile intentions and aggression. Thus, it may be anticipated that such effects are stronger when the hostility and aggression are retaliatory. Here, we test the prediction (Exploratory Hypothesis 7) that vicarious intergroup exclusion leads to greater retaliatory intergroup hostile intentions and aggression (i.e., targeting a member of the excluding outgroup) than displaced intergroup hostile intentions and aggression (i.e., targeting the member of neutral outgroup). German nationals were selected as the target outgroup for indicating displaced hostile intentions and aggression. Like the British outgroup, Germans are also perceived favourably by US nationals according to a survey conducted by the Pew Research Centre in 2018, the year when data collection took place (Poushter & Mordecai, 2020).

7.1. Method

7.1.1. Power analysis

We used the power calculations reported in Study 1 to estimate the sample sizes required to test Hypotheses 1 ($N = 69$) and 2 ($N = 98$). To estimate the necessary sample size required to test Hypothesis 5, we conducted a power analysis using G*Power (Faul et al., 2007, 2009) for a linear multiple regression. The correlation between collective narcissism and intergroup hostility and aggression reported in previous literature tends to be moderate to large, e.g., $r = .37$ (Golec de Zavala et al., 2016). We thus entered a medium effect size of $f^2 = 0.15$, $\alpha = .05$, power = .80, and specified five predictors. The analysis revealed a minimum necessary sample size of 95 participants. We relied on the same a priori power analysis for testing Exploratory Hypothesis 6.

We used G*Power to conduct an a priori sample size analysis determining the necessary sample size to test Exploratory Hypothesis 7 (Faul et al., 2007, 2009). In the absence of previous research allowing a reliable estimate of the anticipated effect size, we relied on a moderate effect size of $f = .25$ to conduct the analysis (Cohen, 1969). We entered $\alpha = .05$ and power = .80 in the analysis, and specified four groups and 1 *df*. The analysis revealed a necessary total sample size of 128 participants to conduct the analysis. We conservatively oversampled, ending data collection on a pre-determined date.

7.1.2. Participants

Six hundred and two US citizens completed the survey via Amazon MTurk. We implemented an attention check measure in the survey, instructing participants to select '*completely agree*' in response to the question. We excluded the responses of participants from the final analyses who failed to correctly respond to this question ($N = 82$). We excluded additional participants ($N = 12$) who responded with '*no*' to the question '*Did the Cyberball game include participants from your national team?*', as such a response indicates that these individuals may have been dishonest about being US nationals. We excluded additional participants who indicated that they either played or observed Cyberball previously ($N = 185$). Such participants have likely been debriefed about the purpose of the manipulation previously.

We asked participants to indicate how many times in total the ball was passed among the players. The game consisted of 30 ball throws, so a very low answer may indicate that the participant was not paying attention, or that they had technical issues and the game did not run as we intended. Because the participant is a passive observer rather than player in the version of the Cyberball game used here, we do not have a way of making sure that they were truly watching the screen throughout. Sixteen participants indicated that the ball was tossed seven or less times in total. Excluding these participants did not change the main pattern of

the results, so for the sake of power, and because we cannot be sure about the true reason behind their responses, we report the following analyses with the inclusion of these participants.

The final sample consisted of 289 participants, 151 females, 137 males, and 1 participant disclosing their gender as 'other'. Participants were between the ages 18 and 80 ($M = 34.68$, $SD = 11.19$). Participants were reimbursed with \$1.00 for their time.

7.1.3. Procedure

We created an online questionnaire ostensibly investigating the link between personality and mental visualization using Qualtrics Software. Participants were first presented with a consent form. Participants were ostensibly randomly allocated to the condition of observer rather than player in the Cyberball game (Williams et al., 2000; Williams & Jarvis, 2006). They were told that they would be connected online with other participants, and that they would observe as those participants played a ball-tossing game (see Chapter 3). In line with the cover story generally used with the Cyberball paradigm, participants were informed that the purpose of the game is to engage in mental visualization, while performance in the game does not matter. They were instructed to try to imagine everything happening on the computer screen as realistically as possible.

In reality, the games were pre-programmed. The Cyberball game was played between six avatars. Three of the avatars were coloured blue, with the word 'USA' displayed below them along the American flag, representing the ingroup, and three of the avatars were coloured red, with the word 'Britain' displayed below them along the UK flag, representing the outgroup (Figure 7.1). Participants were randomly allocated to either the condition of vicarious intergroup exclusion, where members of the outgroup excluded the ingroup from the game after receiving 3 initial throws (10% out of a total of 30 throws) or a control social

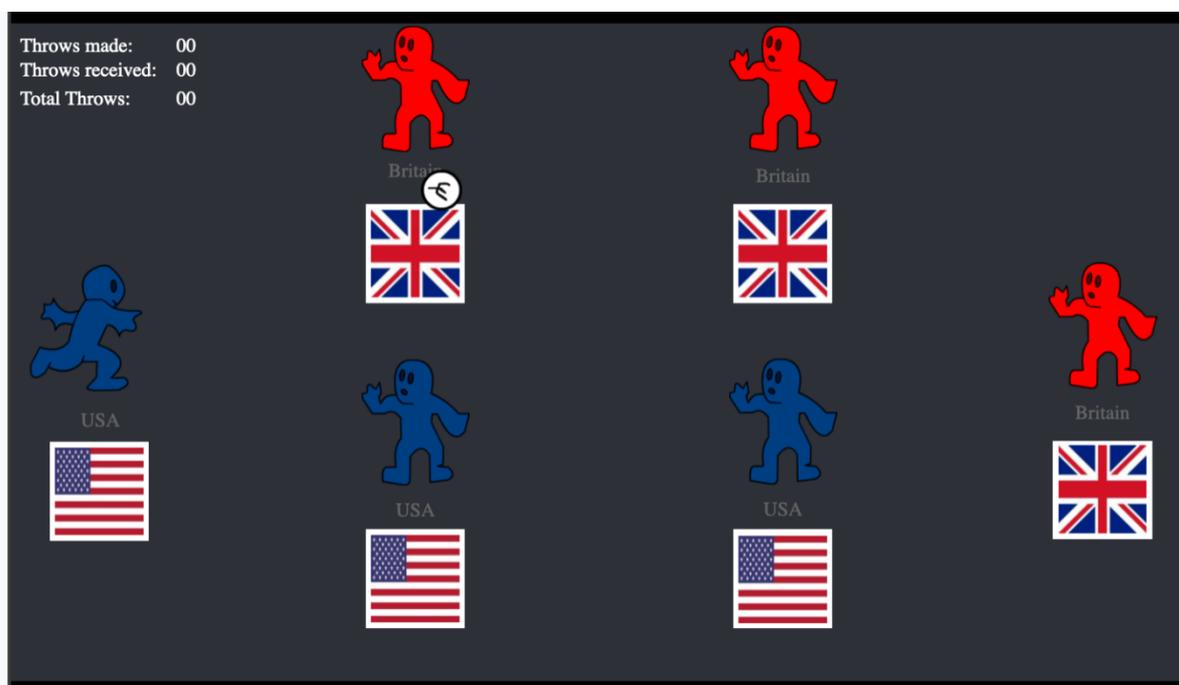
inclusion condition, where the two groups received the ball equally. The game was created using the Cyberball 5 Configuration App (<http://www.empirisoft.com/cyberball.aspx>).

Following the game, participants completed measures of perceived personal exclusion, perceived group exclusion, and mood during the Cyberball game (Wirth & Williams, 2009). Participants next completed the collective narcissism scale (Golec de Zavala et al., 2009) and ingroup satisfaction subscale of the ingroup identification scale (Leach et al., 2008) with reference to the American nation. They were then presented with measures of intergroup hostile intentions (Mackie et al., 2000) and aggression (DeWall et al., 2013). Participants were either randomly assigned to indicate hostile intent and aggression towards the excluding outgroup asking them to indicate how likely they are to engage in the selected actions towards a British person, and to indicate the number of pins they would stab into a voodoo doll representing a British person, or towards a neutral group, asking them to indicate how likely they are to engage in the selected actions towards a German person, and to indicate the number of pins they would stab into a voodoo doll representing a German person.

All participants were debriefed. The random allocation of participants to conditions of the 2 (Cyberball: vicarious intergroup exclusion vs. control social inclusion) x 2 (Aggressive intent: retaliatory vs. displaced) between-participants design is shown in Table 7.1. Ethical approval was granted by the Goldsmiths Ethics Committee.

Table 7.1*Random Allocation of Participants Across the Experimental Conditions in Study 3 (N = 289)*

	Excluding Target Outgroup	Neutral Target Outgroup	Total
Social Exclusion	<i>N</i> = 80	<i>N</i> = 73	<i>N</i> = 153
Social Inclusion	<i>N</i> = 72	<i>N</i> = 64	<i>N</i> = 136
Total	<i>N</i> = 152	<i>N</i> = 137	<i>N</i> = 289

Figure 7.1*The Cyberball Game Used in Study 3 (N = 289)***7.1.4. Measures**

Unless otherwise indicated, all measures were assessed using a 5-point scale (1 = *not at all* to 5 = *extremely*).

Manipulation check. In order to assess whether the manipulation of perceived exclusion was successful, we asked participants to respond to the question ‘*Assuming the ball*

should be thrown to each person equally (50% of throws to players of each team) what percentage of throws did your national team receive in the Cyberball game?’ ($M = 29.08$, $SD = 22.81$; Wirth & Williams, 2009), as in Study 1. We further created an index measure of perceived personal exclusion by averaging participants’ responses to the statements ‘*I felt ignored*’ and ‘*I felt excluded*’ ($\alpha = .91$, $M = 2.93$, $SD = 1.47$), and an index measure of perceived group exclusion by averaging participants’ responses to the statements ‘*My group was ignored*’ and ‘*My group was excluded*’ ($\alpha = .95$, $M = 2.87$, $SD = 1.60$), as in Study 1, based on previous research using similar manipulation checks along the Cyberball paradigm (e.g., Wirth & Williams, 2009).

Mood was assessed by asking participants to indicate the extent to which they experienced the following emotions during the Cyberball game: bad, good, sad, happy, angry, pleasant, based on other experiments assessing mood after the Cyberball game in a similar manner (e.g., Wirth & Williams, 2009). We reverse-scored the negative items in a way that higher scores indicated positive mood ($\alpha = .89$, $M = 3.12$, $SD = 1.01$).

Collective narcissism was assessed as using the 5-item Collective Narcissism Scale with reference to the American nation, using a scale 7-point scale (1 = *completely disagree* to 7 = *completely agree*; e.g., ‘*My group deserves special treatment*’; $\alpha = .86$, $M = 3.73$, $SD = 1.51$).

Ingroup satisfaction was assessed the using the 4-item Ingroup Satisfaction subscale of the Ingroup Identity Scale (Leach et al., 2008) with reference to the American nation, using a 7-point scale (1 = *completely disagree* to 7 = *completely agree*; e.g., ‘*I think that Americans have a lot to be proud of*’; $\alpha = .93$, $M = 5.24$, $SD = 1.44$). The measures of collective narcissism and ingroup satisfaction were presented simultaneously, with their items presented in a randomized order.

Intergroup hostile intentions were measured as in Study 1, using the hostile intentions scale ($\alpha = .86$, $M = 1.88$, $SD = 0.71$; Mackie et al., 2000). Participants were either instructed to indicate their responses on the scale with reference to a member of the British nation, or with reference to a member of the German nation, in line with their randomly allocated target outgroup.

Intergroup aggression was assessed with the voodoo doll task (DeWall et al., 2013), a validated measure of symbolic aggression suitable for online use, similarly to Study 1b. Participants were presented with different images corresponding to either a member of the excluding or a neutral group: An image of a pictogram identical to the avatars used in the Cyberball game, coloured red with the British flag drawn across its torso for the excluding target outgroup condition, and coloured yellow with the German flag drawn across its torso for the neutral target outgroup condition. The target outgroup randomly presented to participants was matched across the intergroup hostile intentions and aggression measures. Participants were informed that stabbing a voodoo doll with pins may help them relieve any negative affect caused by the experiment. Participants were presented with a slider ranging from 0 to 51 and asked to indicate how many pins they would like to stab the doll with. Aggression was measured by the number of pins participants were willing to use ($M = 7.71$, $SD = 13.53$). In order to correct for issues with skewness = 2.01 ($SE = .15$) and kurtosis = 3.20 ($SE = .30$), we added 1 to each participant's number of chosen pins (this way accounting for participants who indicated stabbing 0 pins in the doll) and applied a base 10 logarithmic transformation ($M = .49$, $SD = .60$, $skew = 0.76$, $SE_{skew} = .15$, $kurtosis = -0.95$, $SE_{kurtosis} = .30$), in line with previous suggestions (Chester & Dzierzewski, 2019). Twenty-five participants did not respond to this measure.

7.2. Results

Correlation analyses revealed that mood was negatively related to intergroup hostile intentions and aggression, and positively to ingroup satisfaction. Hostile intentions, aggression, and collective narcissism were all positively related to each other. Ingroup satisfaction and collective narcissism were also positively related (Table 7.2).

Table 7.2

Correlations Among Key Variables in Study 3 (N = 289)

	1	2	3	4
1. Mood	-			
2. Hostile Intentions	-.18**	-		
3. Aggression	-.12 ⁺	.41***	-	
4. Collective Narcissism	.01	.34***	.21***	-
5. Ingroup Satisfaction	.14*	-.07	.09	.56***

Note. *** $p \leq .001$. ** $p < .01$. * $p < .05$. ⁺ $p = .062$.

7.2.1. Manipulation check

We checked that the manipulation of vicarious intergroup exclusion worked as intended. Participants correctly observed a higher percentage of ball throws received by their team during the inclusion condition, while they felt more excluded on a personal and group level in the exclusion condition. This suggests that the manipulation was successful (Table 7.3).

Table 7.3

The Observed Differences on Key Variables Among the Conditions of Vicarious Intergroup Exclusion vs. Control Social Inclusion in Study 3 (N = 289)

Measure	Inclusion: <i>M</i> (<i>SD</i>)	Exclusion: <i>M</i> (<i>SD</i>)	<i>F</i> (1, 288)	η^2
What percentage of the throws did your national team receive in the Cyberball game?	41.63 (19.04)	17.92 (19.94)	106.18***	.27
Perceived personal exclusion	2.18 (1.29)	3.60 (1.29)	87.32***	.23
Perceived group exclusion	1.75 (1.07)	3.85 (1.32)	261.85***	.43
Collective narcissism	3.57 (1.60)	3.89 (1.41)	3.15	.01
Ingroup Satisfaction	5.14 (1.58)	5.34 (1.29)	1.36	.01

Note. *** $p < .001$. *M* = mean. *SD* = standard deviation.

7.2.2. Hypothesis 1

To test Hypothesis 1, predicting that vicarious intergroup exclusion would increase intergroup hostile intentions and aggression, we conducted two independent samples t-tests. We first entered hostile intent as the outcome. Levene's test for equality of variances was nonsignificant, suggesting that equal variances can be assumed, $p = .08$. The results of the t-test suggest that participants did not indicate significantly different levels of hostile intentions following vicarious intergroup exclusion ($M = 1.93$, $SD = 0.77$) than after intergroup inclusion ($M = 1.81$, $SD = 0.64$), $t(287) = 1.38$, $p = .17$, 95% CI [-0.05, 0.28]. This result does not support Hypothesis 1a. We next entered intergroup aggression as the outcome of the same analysis. Levene's test for equality of variances was significant, $p = .002$. We thus report the

results adjusted for a case where the equality of variances cannot be assumed. The results suggest that participants observing intergroup exclusion exhibited significantly greater levels of aggression ($M = 0.57$, $SD = 0.63$) than those observing intergroup inclusion ($M = 0.40$, $SD = 0.54$), $t(261.91) = 2.33$, $p = .021$, 95% CI [0.03, 0.31]. This result remained significant after applying a Bonferroni correction, which reduced the level of significance to $p < .025$, and supports Hypothesis 1b.

7.2.3. Hypothesis 2

In order to test Hypothesis 2, predicting that impaired mood mediates the relationship between vicarious intergroup exclusion and intergroup hostile intentions and aggression, we first tested the effects of the manipulation of vicarious intergroup exclusion on mood. We conducted an independent samples t-test. Levene's test for equality of variances was significant, $p < .001$, we thus report the analysis adjusted for the instance where equality of variances is not assumed. Participants reported significantly lower levels of mood following vicarious intergroup exclusion ($M = 2.83$, $SD = 1.00$) than after intergroup inclusion ($M = 3.91$, $SD = 0.74$), $t(277.58) = -10.45$, $p < .001$, 95% CI [-1.28, -0.87]. Although the manipulation of vicarious intergroup exclusion did not affect self-reported hostile intentions significantly, such an underlying total effect of the predictor on the outcome is only necessary when testing a mediated effect (Preacher & Hayes, 2004, 2008). Its presence is not required to test an indirect effect, which can be observed even in the absence of a total effect. We thus proceeded to test Hypothesis 2.

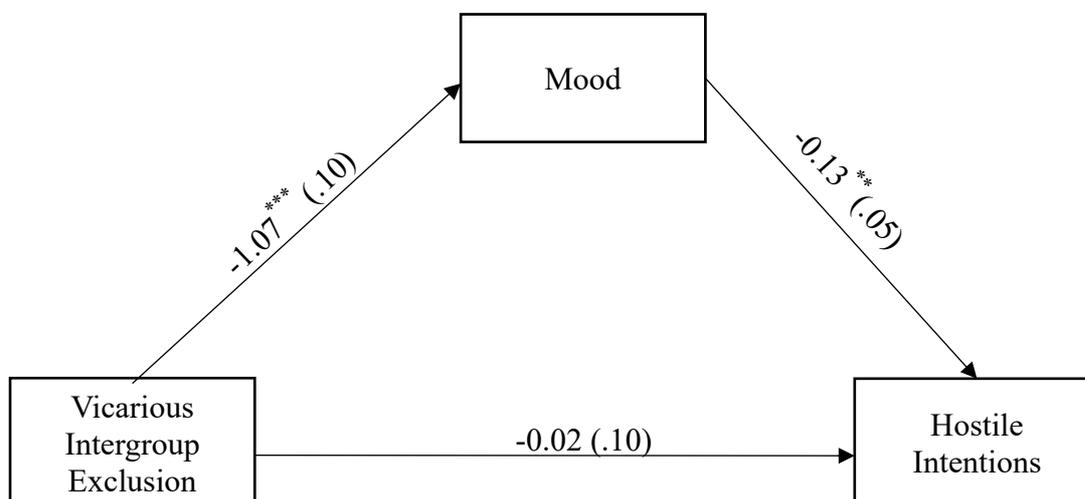
We used Model 4 of PROCESS macro for SPSS (Hayes, 2018). We included the manipulation of vicarious intergroup exclusion as the predictor, mood as the mediator, and hostile intentions as the outcome variable. We added target outgroup as a covariate (the analyses revealed the same pattern of results without the covariate). We asked for 10,000 bootstrapped samples. The overall model was significant, $F(3, 285) = 3.97$, $R^2 = .04$, $p = .01$.

The results indicate that vicarious intergroup exclusion predicted mood negatively, 95% CI [-1.28, -0.87], while mood predicted hostile intentions negatively, 95% CI [-0.22, -0.04].

Although the direct effect of vicarious intergroup exclusion on hostile intent was nonsignificant, 95% CI [-0.21, 0.17], its indirect effect was, 95% CI [0.03, 0.25], $b = .14$, $SE = .06$. These results are in line with Hypothesis 2a and are illustrated in Figure 7.2. We next entered aggression as the outcome of the same model. The overall model was nonsignificant, $F(3, 260) = 1.98$, $R^2 = .02$, $p = .12$. We thus do not report further results from this analysis. These results do not support Hypothesis 2b.

Figure 7.2

The Direct and Indirect Effects of Vicarious Intergroup Exclusion on Intergroup Hostile Intentions in Study 3 (N = 289)



Note. *** $p < .001$. ** $p < .01$. Exclusion was coded 1, the control condition 0.

7.2.4. Hypothesis 5 and Exploratory Hypothesis 6

We next tested Hypothesis 5, predicting that collective narcissism moderates the effects of vicarious intergroup exclusion on intergroup hostile intentions and aggression. We compared these results to an alternative model (Exploratory Hypothesis 6), including ingroup satisfaction, a secure form of ingroup attachment as a moderating variable. Both collective narcissism and ingroup satisfaction were assessed after the manipulation of vicarious intergroup exclusion. Mean comparisons revealed that neither variable was affected by the manipulation (Table 7.3).

We conducted four moderation analyses using Model 1 of PROCESS macro for SPSS (Hayes, 2018). We entered the experimental manipulation of vicarious intergroup exclusion as the predictor and hostile intentions as the outcome in the first two analyses. We asked for 10,000 bootstrapped samples.

We first entered collective narcissism as the moderator. We entered ingroup satisfaction as a covariate to account for the overlap between the two variables, as well as target outgroup (when removing the covariates, the main effect of the manipulation of exclusion became significant, while the pattern of additional results remained unchanged). The overall model was significant, $F(5, 283) = 17.67, R^2 = .24, p < .001$. The main effect of the manipulation of vicarious intergroup exclusion was nonsignificant, $b = -0.37, SE = .20, p = .07, 95\% \text{ CI } [-0.76, 0.03]$, while that of collective narcissism was significant, $b = 0.20, SE = .04, p < .001, 95\% \text{ CI } [0.12, 0.28]$. The interaction between the manipulation of exclusion and collective narcissism was significant, $F(1, 283) = 5.53, p = .02, R^2 \text{ change} = .01$. A simple slopes analysis revealed that low levels of collective narcissism (-1 SD) did not influence the effects of vicarious intergroup exclusion on hostile intentions, $b = -0.13, SE = .11, 95\% \text{ CI } [-0.36, 0.09]$, while high levels of collective narcissism ($+1 \text{ SD}$) predicted an increase in hostile intentions following vicarious intergroup exclusion, $b = 0.26, SE = .11, 95\% \text{ CI } [0.04, 0.47]$. These results are in line with Hypothesis 5a.

We next ran the same model, this time including ingroup satisfaction as the moderator and collective narcissism and target outgroup as covariates (when removing the covariates, the main effect of ingroup satisfaction became nonsignificant, while the pattern of all other results remained unchanged). The overall model was significant, $F(5, 283) = 16.59$, $R^2 = .23$, $p < .001$. The main effect of the manipulation of vicarious intergroup exclusion was nonsignificant, $b = -0.25$, $SE = .29$, $p = .38$, 95% CI [-0.81, 0.31], while that of ingroup satisfaction was significant, $b = -0.22$, $SE = .04$, $p < .001$, 95% CI [-0.29, -0.14]. The interaction between the manipulation of exclusion and ingroup satisfaction was nonsignificant, $F(1, 283) = 1.35$, $p = .25$, $R^2 \text{ change} = .004$, suggesting that ingroup satisfaction did not moderate the effects of vicarious intergroup exclusion on subsequent hostile intentions. These results do not support Exploratory Hypothesis 6a.

We next conducted the same moderation models, this time including aggression as the outcome variable. When adding collective narcissism as the moderator and ingroup satisfaction and target outgroup as covariates (the pattern of results remained unchanged when removing the covariates), the overall model was significant, $F(5, 258) = 3.45$, $R^2 = .06$, $p = .01$. The main effects of vicarious intergroup exclusion, $b = -0.04$, $SE = .20$, $p = .82$, 95% CI [-0.44, 0.35], those of collective narcissism, $b = 0.06$, $SE = .04$, $p = .10$, 95% CI [-0.01, 0.14], and their interaction, $F(1, 258) = 1.04$, $p = .31$, $R^2 \text{ change} = .004$, were all nonsignificant. These results indicate that collective narcissism did not influence the effects of vicarious intergroup exclusion on intergroup aggression, and thus do not support Hypothesis 5b.

When adding ingroup satisfaction as the moderator and collective narcissism and target outgroup as covariates, (the pattern of results remained unchanged when removing the covariates), the overall model was significant, $F(5, 258) = 3.46$, $R^2 = .06$, $p = .01$. The main effects of vicarious intergroup exclusion, $b = -0.13$, $SE = .28$, $p = .63$, 95% CI [-0.68, 0.41],

those of ingroup satisfaction, $b = -0.04$, $SE = .04$, $p = .30$, 95% CI [-0.11, 0.04], and their interaction, $F(1, 258) = 1.08$, $p = .30$, $R^2 \text{ change} = .004$, were all nonsignificant. These results indicate that ingroup satisfaction not did moderate the effects of vicarious intergroup exclusion on aggression, and thus do not support Exploratory Hypothesis 6b.

7.2.5. Exploratory Hypothesis 7

We next conducted two exploratory analyses, aiming to uncover whether the intergroup hostility and aggression following vicarious intergroup exclusion is greater when targeting members of the excluding outgroup, compared members of a neutral outgroup. We first conducted a 2 x 2 ANOVA, including intergroup hostile intentions as the outcome variable, and the manipulation of intergroup exclusion and target outgroup as the predictors. Levene's test of equality of error variances was significant, $p = .001$. In order to account for the severe violation, we lowered the level of significance in the main analyses to $p < .01$, following the recommendations of Tabachnick and Fidell (2007). This way, we avoided transformation of the dependent variable, which may hinder the interpretation of the data. The results indicated that the manipulation of intergroup exclusion did not influence intergroup hostile intentions, $F(1, 288) = 1.74$, $p = .19$, $\eta^2 = .01$, detailed in section 7.2.2. Participants also did not differ significantly in their self-reported hostile intentions when they were directed towards a member of the excluding outgroup ($M = 1.93$, $SD = 0.77$) or a neutral outgroup ($M = 1.81$, $SD = 0.64$), $F(1, 288) = 2.02$, $p = .16$, $\eta^2 = .01$. The interaction between the manipulation of vicarious intergroup exclusion and target outgroup was also nonsignificant, $F(1, 288) = 1.91$, $p = .17$, $\eta^2 = .01$. These results do not support Exploratory Hypothesis 7a.

We next entered intergroup aggression into the same analysis as the dependent variable. The analysis indicated that Levene's test of equality of error variances was significant, $p = .02$. In order to account for the moderate violation, we lowered the level of

significance in the main analyses to $p < .025$, following the recommendations of Tabachnick and Fidell (2007). This way, we avoided transformation of the dependent variable, which may hinder the interpretation of the data. The results indicate that following manipulation of intergroup exclusion, participants engaged in increased levels of aggression compared to those in the condition of vicarious social inclusion, with marginal significance, $F(1, 263) = 5.04, p = .026, \eta^2 = .02$, detailed in section 7.2.2. Participants did not differ significantly in levels of intergroup aggression when directed towards a member of the excluding outgroup ($M = 0.49, SD = 0.61$) or a neutral outgroup ($M = 0.49, SD = 0.59$), $F(1, 263) = 0.001, p = .97, \eta^2 < .001$. The interaction between the manipulation of vicarious intergroup exclusion and target outgroup was also nonsignificant, $F(1, 263) = 0.36, p = .55, \eta^2 = .001$. These results indicate that participants engaged in comparable levels of increased aggression following vicarious intergroup exclusion, regardless of whether the aggression was retaliatory or displaced. These results thus do not support Hypothesis 7b.

7.3. Discussion

Study 3 tested Hypotheses 1 and 2 in an existing national intergroup context. The results did not support Hypothesis 1a, predicting that vicarious intergroup exclusion is associated with increased intergroup hostile intentions. This is not consistent with the results of Studies 1a and 1b, indicating the presence of such an effect. Study 1 was conducted in the context imaginary, rather than existing groups. The discrepancy among these results may be due to social norms. Hostility may be perceived as less acceptable towards members of a real nation than towards members of an imaginary group. However, it is important to note that Study 2, also conducted in the context of imaginary groups, did not replicate the predicted effects of vicarious intergroup exclusion on hostile intention. Thus, further testing of this hypothesis is necessary to clarify the results. We address this in Study 4.

The results of Study 3 supported Hypothesis 1b, predicting that vicarious intergroup exclusion leads to increased intergroup aggression. This hypothesis was not supported by Studies 1b and 2, conducted in the context of imaginary groups (though the results of Study 1b were in the anticipated direction). It is likely that participants holding pre-existing attachment and identification with their group are affected more severely by observing their ingroup's exclusion than those allocated to a membership in a minimal group. Under this assumption, due to their greater sensitivity to intergroup exclusion, they may respond with increased levels of aggression. In order to gain confidence in these results, we aim to replicate them in Study 4.

Study 3 also yielded data in support of Hypothesis 2a, suggesting that vicarious intergroup exclusion impairs mood. Despite not finding a main effect of exclusion on intergroup hostile intentions, exclusion did affect intergroup hostile intentions indirectly, via mood impairment. This is in line with Hypothesis 2b, and indicates that mood impairment plays a key role in the intergroup hostility following vicarious intergroup exclusion. Hypothesis 2c, predicting that vicarious intergroup exclusion would increase intergroup aggression via impaired mood, was not supported by Study 3. This suggests that exclusion was related to increased aggression regardless of mood impairment.

Study 3 tested Hypothesis 5, predicting that collective narcissism would be related to an even greater increase in intergroup hostile intentions and aggression following vicarious intergroup exclusion, while ingroup satisfaction is controlled for. Collective narcissism had a main effect on intergroup hostile intentions, suggesting those holding collective narcissistic beliefs about their nation were more inclined to report hostile intentions across both conditions. This is in line with the hostile disposition characterising collective narcissism (Golec de Zavala, Dyduch-Hazar, et al., 2019). Although exclusion did not have a main effect on intergroup hostile intentions in the present sample, the results of a moderation analysis

revealed that individuals high in collective narcissism did exhibit an increase in intergroup hostility following vicarious intergroup exclusion. This is in line with Hypothesis 5a, and with the research indicating that collective narcissism is related to intergroup hostility especially in context of threat to the ingroup's image (Golec de Zavala, Cichocka, & Iskra-Golec, 2013; Golec de Zavala, Dyduch-Hazar, et al., 2019; Golec de Zavala et al., 2016). Crucially, this threat may be merely perceived, rather than real. In the context of the Cyberball game, the social exclusion of the ingroup may evoke the hypersensitivity characterising collective narcissism. Those holding collective narcissistic beliefs may be inclined to view the exclusion episode as a more severe form of ingroup derogation, than individuals low in collective narcissism. The results indicate that collective narcissism did not influence intergroup aggression following vicarious intergroup exclusion, and thus did not support Hypothesis 5b. This may be due to already elevated levels of intergroup aggression observed across the sample.

In an exploratory manner, Study 3 also tested whether a different, more secure form of ingroup positivity may lead to enhanced hostile intentions and aggression following vicarious intergroup exclusion. Ingroup satisfaction predicted intergroup hostile intentions negatively across the conditions of vicarious intergroup exclusion and inclusion. However, this effect was only visible when collective narcissism and target outgroup were entered as covariates in the model. Collective narcissism and ingroup satisfaction tend to correlate positively, yet they tend to predict different intergroup behaviours (Dyduch-Hazar et al., 2019; Golec de Zavala, 2019; Golec de Zavala, Dyduch-Hazar, et al., 2019; Golec de Zavala, Federico, et al., 2019). Thus, the effect of ingroup satisfaction on intergroup hostility is likely only visible when its overlap with collective narcissism is partialled out. Ingroup satisfaction, however, did not interact with the conditions of vicarious intergroup exclusion and inclusion. It also did not affect intergroup aggression significantly. The results thus do not support

Exploratory Hypothesis 6. They indicate that the moderating effect of collective narcissism on intergroup exclusion is unique to a non-secure form of ingroup positivity, characterised by hypersensitivity to threat to the group's image, and contingent upon external recognition, but may not generalize to other, secure forms of ingroup positivity. Nevertheless, it is recommended that future research explores this topic further, comparing the potential moderating effects of alternative forms of ingroup positivity as well.

Finally, Study 3 also explored whether the hostile intentions and aggression following vicarious intergroup exclusion are stronger when retaliatory in nature, or whether they are equally likely to be displaced. The analyses indicated no significant differences across target outgroups in intergroup hostile intentions. This result may be due to the absence of an effect of exclusion on intergroup hostile intentions. However, there was also no significant difference in intergroup aggression following vicarious intergroup exclusion across the target outgroups. This is a crucial finding, as it indicates that even after a trivial form of vicarious intergroup exclusion, induced here by an online ball-tossing game, individuals are motivated to engage in aggression toward members of any outgroup, not just that responsible for the exclusion. This indicates that the consequences of vicarious intergroup exclusion may affect more individuals and groups than one might be inclined to think at first glance.

Study 3 provides initial data examining the effects of vicarious intergroup exclusion in the context of real, rather than imaginary groups. These indicate that a slightly different pattern from the data collected in Studies 1 and 2. Notably, in this context, vicarious intergroup exclusion did not influence intergroup hostility significantly, although it did indirectly, via impaired mood. Observed exclusion did lead to an increase in intergroup aggression, however there was no indirect link between vicarious intergroup exclusion and intergroup aggression via mood impairment. To clarify these discrepancies, we next turned to

investigating the effects of vicarious intergroup exclusion in a novel cultural and intergroup context.

Chapter 8.

Study 4: Alleviating the Negative Consequences of Vicarious Intergroup Exclusion Using Mindfulness Meditation

The main objectives of Study 4 were to replicate previous findings in a novel intergroup setting and to test an intervention designed to alleviate the negative consequences of vicarious intergroup exclusion. Mindfulness entails a special type of non-judgemental moment-to-moment attention to internal and external experiences, with the absence of any necessity to react to one's present experience (Martelli et al., 2018). Study 4 aimed to fortify emotional resilience using audio-guided mindfulness meditation, thus allowing participants a more adaptive way of downregulating the negative affect arising as they observe the exclusion of their ingroup.

The practice of mindfulness meditation has been related to enhanced emotion regulation (Boyle et al., 2017; Garland et al., 2015; Slutsky et al., 2017; Wheeler et al., 2017), resilience to adversity (Kemeny et al., 2012; Kok et al., 2013; Porges, 2007), and threat (Brown et al., 2012, 2013). Throughout this thesis, we tested the prediction that the hostile and aggressive response to vicarious intergroup exclusion is driven by mood impairment. Given this assumption, it is reasonable to anticipate that mindfulness meditation training may diminish the link between exclusion and mood impairment by enhancing emotion regulation. It should thus also alleviate subsequent intergroup hostile intentions and aggression.

Additionally, mindfulness meditation has been negatively associated with aggressive responses to provocation (DeSteno et al., 2018), implicit racial prejudice (Lueke & Gibson, 2015), and positively associated with intergroup acceptance (Pinazo & Bresó, 2017). In the context of social exclusion, trait mindfulness has been associated with decreased emotional distress (Martelli et al., 2018), mood recovery (Keng & Tan, 2018;

Molet et al., 2013), and increased empathy towards ostracized strangers (Berry et al., 2018). Such data further support the predictions tested here.

Recently, research investigating the effects of mindfulness meditation has been criticised by the scientific community (Anderson et al., 2019; Van Dam et al., 2018). While research indicates that the practice of mindfulness may be beneficial, it is difficult to draw conclusions about its effects due to the methodological and procedural variability. Among others, the length of mindfulness interventions as well as the exact type of mindfulness practice employed tends to vary considerably across studies. This makes it difficult to understand what aspects of the practice are related to the benefits.

In order to address this, Study 4 introduced two different types of audio-guided mindfulness meditation practice, and compared them to a control condition. One of the meditations was based on the body scan, a classic mindfulness meditation practice guiding attention throughout the body, from the feet to the head (Kabat-Zinn, 2013). The second meditation combined the classic body scan with the cultivation of gratitude, a feeling of being thankful for and appreciative of aspects of one's experience (Wood et al., 2010). Mindfulness meditation is often practiced with a focus on positive and prosocial emotions (Fredrickson et al., 2008). We chose gratitude for the present intervention due to its positive association with emotional resilience (Emmons & McCullough, 2003) and negative association with interpersonal aggression (DeWall et al., 2012). We predicted (Hypothesis 8) that the audio-guided meditation interventions, but not a control audio condition, would alleviate the mood impairment, intergroup hostile intentions, and aggression after vicarious intergroup exclusion.

Additionally, Study 4 aimed to test the predictions (Hypothesis 1) that vicarious intergroup exclusion leads to intergroup hostile intentions and aggression, and (Hypothesis 2) that mood impairment underlies these effects, in a novel sample and intergroup context. The

data was collected in Poland. The intergroup context of the Cyberball game was set between Polish and Ukrainian players. The Ukrainian community makes up a minority group in Poland. Previous research indicates that belonging to a majority or minority group whilst experiencing social exclusion does not influence the effects of exclusion (Schaafsma & Williams, 2012). In a 2019 survey, 41% of Poles indicated that they hold negative views towards Ukrainians, while 31% reported positive attitudes (Polish Public Opinion Research Center, 2019). The slightly negative view should be noted, however, as these percentages lie close to each other, we anticipated that attitudes towards Ukrainians would not influence the data collected here.

8.1. Method

8.1.1. Power analysis

We used the a priori sample size calculations reported in Study 1 to establish the sample size necessary to test Hypotheses 1 ($N = 69$) and 2 ($N = 98$). We used G*Power to calculate the sample sizes necessary to test Hypotheses 8a-c (Faul et al., 2007, 2009). The calculations were conducted for an F test with fixed effects, special, main effects, and interactions. We specified power = .80, $\alpha = .05$, 6 groups and 2 numerator df . For Hypothesis 8a, predicting that a mindfulness meditation would alleviate the negative effects of vicarious intergroup exclusion on mood impairment, we employed an effect size from previous research indicating the correlation between mindfulness and perceived stress, $|r| = .42$ (Boyle et al., 2017). The analysis revealed a total required sample of 49 participants. In order to calculate the sample size required to test Hypotheses 8b and 8c, predicting that mindfulness meditation would counteract the increase in intergroup hostile intentions and aggression following vicarious intergroup exclusion, we relied on the effect size associated with the effects of mindfulness meditation on a decrease in responding aggressively to provocation, d

= .84 (DeSteno et al., 2018). The analysis revealed a total necessary sample of 58 participants. We conservatively oversampled, ending data collection on a predetermined date.

8.1.2. Participants

Seven hundred and six Polish adults were recruited by the Ariadna research panel to participate (www.panelariadna.pl), 350 females, 356 males, between the ages 20 and 81 ($M = 44.16$, $SD = 13.46$). We implemented two attention check measures in the survey, instructing participants to select '*completely agree*' in response to the question. All participants responded correctly. None of the participants had prior experience with Cyberball.

8.1.3. Procedure

Participants were presented with a consent form, informing them about the general procedure of the experiment. Participants were randomly allocated to a mindfulness meditation, mindful gratitude meditation, or control condition, unbeknownst to them. They were presented with a 10-minute long audio recording corresponding to the relevant condition (see Section 8.1.4), and asked to carefully listen to the recording and to follow any instructions that they may hear.

As in Studies 1-3, participants were next ostensibly randomly allocated to the condition of observer rather than player in the Cyberball game (Williams et al., 2000; Williams & Jarvis, 2006). They were told that they would be connected online with other participants, and that they would observe as those participants played a ball-tossing game (see Chapter 3). In line with the cover story generally used with the Cyberball paradigm, participants were informed that the purpose of the game is to engage in mental visualization, while performance in the game does not matter. They were instructed to try to imagine everything happening on the computer screen as realistically as possible.

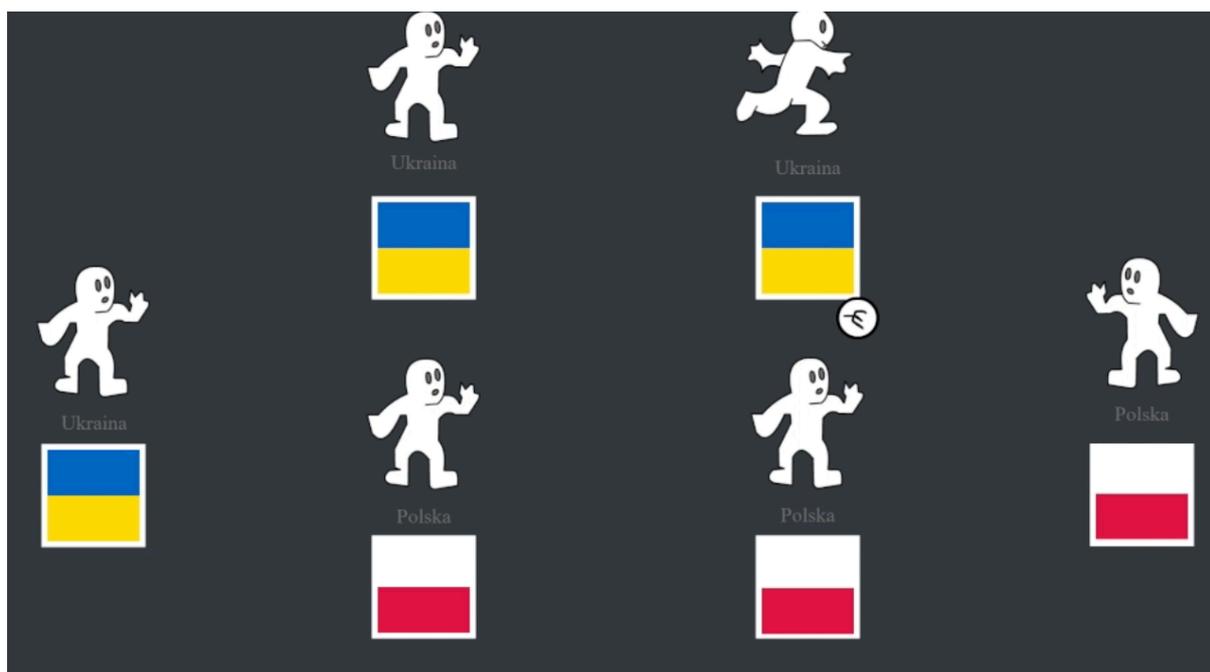
In reality, the games were pre-programmed. The Cyberball game was played between six avatars, as in Studies 1-3. Three of the avatars had the word 'Poland' displayed below

them along the Polish flag, representing the ingroup, and three of the avatars had the word 'Ukraine' displayed below them along the Ukrainian flag, representing the outgroup (Figure 8.1). Participants were randomly allocated to either the condition of vicarious intergroup exclusion, where members of the outgroup excluded the ingroup from the game after receiving 3 throws initially (10% out of a total of 30 throws) or a control social inclusion condition, where the Polish team received the ball 53% of the time. The game was created using the Cyberball 5 Configuration App (<http://www.empirisoft.com/cyberball.aspx>). The random allocation of participants according to the 2 (exclusion: vicarious intergroup exclusion vs. vicarious intergroup inclusion) x 3 (meditation: mindfulness meditation vs. mindful gratitude meditation vs. control) fully between-participants design is presented in Table 8.1.

Following the game, participants were asked to indicate how often their team received the ball during the game, and completed measures of perceived personal exclusion, perceived group exclusion as manipulation checks of the exclusion manipulation. As manipulation checks of the intervention, participants responded to questions assessing state mindfulness (Tanay & Bernstein, 2013) and gratitude (McCullough et al., 2002). We then assessed mood during the Cyberball game (Wirth & Williams, 2009). Participants were finally presented with a measure of intergroup hostile intentions (Mackie et al., 2000) and aggression (DeWall et al., 2013). Participants were debriefed. Ethical approval was granted by the Ethics Committee of SWPS University of Social Sciences and Humanities.

Table 8.1*Random Allocation of Participants Across the Experimental Conditions (N = 706)*

	Vicarious Exclusion	Vicarious Inclusion	Total
Mindfulness	N = 123	N = 103	N = 226
Mindful Gratitude	N = 104	N = 129	N = 233
Control	N = 121	N = 126	N = 247
Total	N = 348	N = 358	N = 706

Figure 8.1*The Cyberball Game Used in Study 4 (N = 706)*

8.1.4. Mindfulness Meditation Intervention

The mindfulness meditation, mindful gratitude meditation, and the control anatomical text used in Study 4 were developed in collaboration with a certified mindfulness meditation trainer. The mindfulness meditation was based on the body scan, a standard form of meditation that guides non-judgemental attention to physical sensations of the body, slowly

moving the focus from the feet to the head (Kabat-Zinn, 2013). The standard body scan was shortened from 30-minutes to 10-minutes for the sake of the present experiment. The mindful gratitude meditation was based on the same standard body scan. Here, beyond simply bringing awareness to bodily sensations, participants were additionally asked to send the feeling of gratitude to each body part in turn that they were focusing their attention on. In the control condition, participants listened to a reading of an excerpt from an anatomical textbook, similarly naming body parts as the two meditation recordings, but without any aspects of mindfulness meditation being involved. A certified mindfulness trainer recorded each of the three audios in a studio. This ensured that the intonation of the meditations is identical to what someone undergoing professional meditation training would experience, and that the voice was kept consistent across the conditions. Each of the recordings lasted approximately 10 minutes long. The complete texts corresponding to each condition can be found in Appendix C.

8.1.5. Measures

Unless otherwise indicated, all measures were assessed on a 7-point scale (1 = *completely disagree*, 7 = *completely agree*).

Manipulation check.

Vicarious Intergroup Exclusion. In order to assess whether our manipulation of perceived exclusion was successful, we asked participants to respond to the question '*Assuming the ball should be thrown to each person equally (50% of throws to players of each team) what percentage of throws did your national team receive in the Cyberball game?*'. Participants were instructed to choose an answer out of the options 1 = 0%, 2 = 1%, 3 = 20%, 4 = 30%, 5 = 40%, 6 = 50%, 7 = 60%, 8 = 70%, 9 = 80%, 10 = 90%, 11 = 100% ($M = 4.75$, $SD = 1.85$) (Wirth & Williams, 2009). We further created an index measure of perceived personal exclusion by averaging participants' responses to the statements '*I felt*

ignored' and *'I felt excluded'* ($\alpha = .93$, $M = 3.70$, $SD = 1.56$), and an index measure of perceived group exclusion by averaging participants' responses to the statements *'My group was ignored'* and *'My group was excluded'* ($\alpha = .96$, $M = 3.91$, $SD = 1.63$), as in Study 1, based on previous research using overlapping manipulation checks along the Cyberball paradigm (e.g., Wirth & Williams, 2009).

Mindfulness. In order to assess whether the mindfulness intervention produced the desired effects, we asked participants to respond to three items of the State Mindfulness Scale (Tanay & Bernstein, 2013): *'I felt that I was fully experiencing the present moment'*, *'I tried to pay attention to pleasant and unpleasant feelings'*, and *'I was interested in observing the principles that guide my thinking'*. We created an index score by averaging responses to these items ($\alpha = .80$, $M = 4.55$, $SD = 1.01$).

Gratitude. In order to assess whether the mindful gratitude intervention produced the desired effects, we asked participants to respond to three items of the Gratitude Questionnaire (McCullough et al., 2002): *'There are many things in my life that I can feel grateful for'*, *'If I were to mention everything I feel grateful for, it would be a very long list'*, and *'I am grateful to many different people'*. We created an index score by averaging responses to these items ($\alpha = .84$, $M = 4.88$, $SD = 0.99$).

Mood was assessed by asking participants to indicate the extent to which they experienced the following emotions during the Cyberball game: good, happy, relaxed, resentful, regret, indignant, threatened, based on other experiments assessing mood after the Cyberball game in a similar manner (e.g., Wirth & Williams, 2009). We averaged responses on the scale, reverse-scoring the negative items in a way that higher scores indicated positive mood ($\alpha = .89$, $M = 4.40$, $SD = 1.09$).

Intergroup hostile intentions were measured using a scale adapted from Mackie, Devos, and Smith (2000). We created a scale containing 9 behaviours, and instructed

participants to indicate the extent to which they would engage in each of the following behaviours when encountering a Ukrainian individual. Participants indicated the extent to which they would hurt them, harm them, offend them, humiliate them, attack them, threaten them, talk to them in a friendly way, shake hands with them, or help them. We reverse scored the positive items, and averaged participants' scores, creating an index score representing hostile intent ($\alpha = .94$, $M = 2.80$, $SD = 1.14$).

Intergroup aggression was assessed with the voodoo doll task (DeWall et al., 2013), a validated measure of symbolic aggression suitable for online use, as in Study 1b. Participants were presented with an image of a voodoo doll (Figure 5.4), and told to imagine that the doll represents a member of the opposing Cyberball team. Participants were informed that stabbing pins into the doll may relieve negative affect that they may have experienced during the experiment. Participants were presented with a slider ranging from 0 to 51 and asked to indicate how many pins they would like to stab the doll with. Aggression was measured by the number of pins participants were willing to use ($M = 10.04$, $SD = 14.68$). In order to correct for issues with skewness = 1.37 ($SE = .09$), we added 1 to each participant's number of chosen pins (this way accounting for participants who indicated stabbing 0 pins in the doll) and applied a base 10 logarithmic transformation ($M = .60$, $SD = .64$, $skew = 0.47$, $SE_{skew} = .09$), in line with previous suggestions (Chester & Dzierzewski, 2019).

8.2. Results

Correlation analyses revealed that mood was negatively related to intergroup hostile intentions, $r(704) = -.51$, $p < .001$, and intergroup aggression, $r(704) = -.33$, $p < .001$.

Intergroup hostile intentions and aggression were positively related to each other, $r(704) = .60$, $p < .001$.

8.2.1. Manipulation check

Vicarious intergroup exclusion. Participants correctly observed a higher percentage of ball throws received by their team during the inclusion condition, while they felt more excluded on a personal and group level in the exclusion condition. This suggests that the manipulation of vicarious intergroup exclusion was successful. These results are illustrated in Table 8.2.

Mindfulness meditation. A one-way analysis of variance revealed that there were no significant differences in self-reported levels of state mindfulness following the mindfulness meditation intervention ($M = 4.59, SD = 0.94$), mindful gratitude intervention ($M = 4.52, SD = 1.07$), and that reported by the control group ($M = 4.54, SD = 1.01$), $F(2, 703) = 0.29, p = .75, \eta^2 = .001$. There were also no significant differences in self-reported levels of gratitude following the mindfulness meditation intervention ($M = 4.85, SD = 0.99$), mindful gratitude intervention ($M = 4.90, SD = 0.99$), and that reported by the control group ($M = 4.90, SD = 0.98$), $F(2, 703) = 0.15, p = .86, \eta^2 < .001$. These results suggest that the mindfulness meditation interventions did not achieve the desired effects.

Table 8.2

The Observed Differences on the Manipulation Check Measures Among the Conditions of Vicarious Intergroup Exclusion vs. Control Social Inclusion in Study 4 (N = 706)

Measure	Inclusion: <i>M</i> (<i>SD</i>)	Exclusion: <i>M</i> (<i>SD</i>)	<i>F</i> (1, 705)	η^2
What percentage of the throws did your national team receive in the Cyberball game?	5.86 (1.17)	3.62 (1.72)	411.64***	.37
Perceived personal exclusion	3.10 (1.38)	4.31 (1.50)	124.13***	.15
Perceived group exclusion	3.03 (1.30)	4.81 (1.42)	302.53***	.30

Note. *** $p < .001$. *M* = mean. *SD* = standard deviation.

8.2.2. Hypothesis 1

To test Hypothesis 1, predicting that vicarious intergroup exclusion would increase intergroup hostile intentions and aggression, we conducted two independent samples t-tests. We first entered intergroup hostile intentions as the outcome. Levene's test for equality of variances was nonsignificant, suggesting that equal variances can be assumed, $p = .25$. The results of the t-test suggest that participants indicated significantly greater levels of hostile intentions following vicarious intergroup exclusion ($M = 3.01$, $SD = 1.16$) than after intergroup inclusion ($M = 2.59$, $SD = 1.08$), $t(704) = -5.07$, $p < .001$, 95% CI [-0.59, -0.26]. We next entered aggression as the outcome of the same analysis. Levene's test for equality of variances was nonsignificant, $p = .07$. The results suggest that participants observing intergroup exclusion exhibited significantly greater levels of aggression ($M = 0.69$, $SD = 0.65$) than those observing intergroup inclusion ($M = 0.51$, $SD = 0.62$), $t(704) = -3.77$, $p <$

.001, 95% CI [-0.27, -0.08]. These results remained significant after applying a Bonferroni correction, which reduced the level of significance to $p < .025$, and support Hypothesis 1.

8.2.3. Hypothesis 2

In order to test Hypothesis 2, predicting that vicarious intergroup exclusion leads to intergroup hostile intention and aggression indirectly, via impaired mood, we first tested the effects of the manipulation of vicarious intergroup exclusion on mood. We conducted an independent samples t-test. Levene's test for equality of variances was nonsignificant, $p = .44$. Participants reported significantly lower levels of mood following vicarious intergroup exclusion ($M = 3.98$, $SD = 1.07$) than after intergroup inclusion ($M = 4.81$, $SD = 0.95$), $t(704) = 10.87$, $p < .001$, 95% CI [0.68, 0.98].

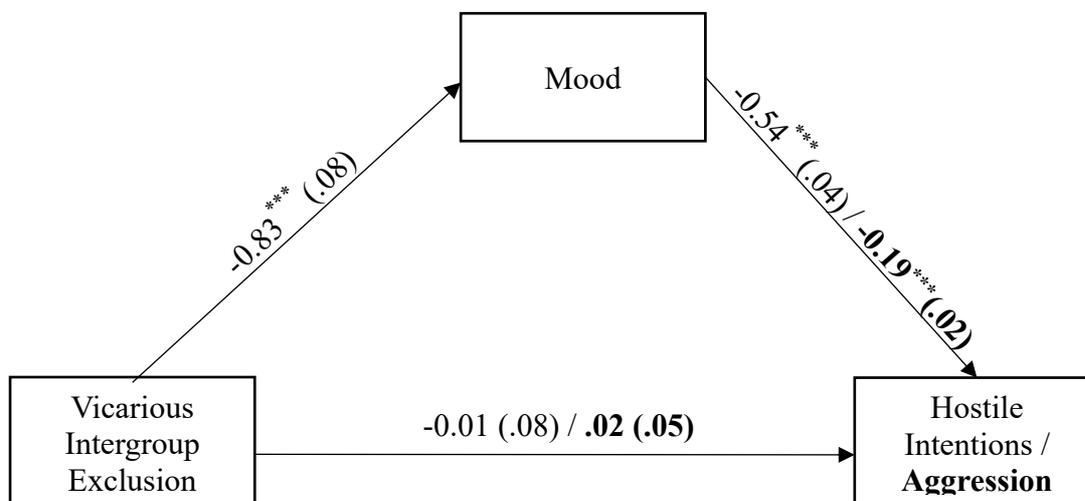
We next used Model 4 of PROCESS macro for SPSS (Hayes, 2018) to conduct a mediation analysis. We included the manipulation of vicarious intergroup exclusion as the predictor, mood as the mediator, and hostile intentions as the outcome variable. We added the mindfulness intervention as a covariate (both analyses revealed the same pattern of results without the covariate). We asked for 10,000 bootstrapped samples. The overall model was significant, $F(3, 702) = 82.66$, $R^2 = .26$, $p < .001$. The results indicate that vicarious intergroup exclusion predicted mood negatively, 95% CI [-0.98, -0.68], while mood predicted hostile intentions negatively, 95% CI [-0.61, -0.46]. Although the direct effect of vicarious intergroup exclusion on hostile intent was nonsignificant, 95% CI [-0.17, 0.14], its indirect effect was, 95% CI [0.34, 0.55], $b = .44$, $SE = .05$. These results are in line with Hypothesis 2 (Figure 8.2).

We next entered aggression as the outcome of the same model. The overall model was significant, $F(3, 702) = 29.15$, $R^2 = .11$, $p < .001$. Mood predicted intergroup aggression negatively, 95% CI [-0.24, -0.15]. Although the direct effect of vicarious intergroup exclusion on aggression was nonsignificant, 95% CI [-0.07, 0.12], its indirect effect was,

95% CI [0.11, 0.20], $b = .16$, $SE = .02$. These results are in line with Hypothesis 2 (Figure 8.2).

Figure 8.2

The Direct and Indirect Effects of Vicarious Intergroup Exclusion on Intergroup Hostile Intentions and Aggression in Study 4 (N = 706)



Note. *** $p < .001$. Exclusion was coded 1, the control condition 0.

8.2.4. Hypothesis 8

In order to test Hypothesis 8, predicting that fortifying emotional resilience would alleviate the negative consequences of vicarious intergroup exclusion, we ran three analyses of variance. We added the intervention conditions and the manipulation of vicarious intergroup exclusion as the predictors in each. In the first model, we entered mood as the outcome variable. Levene's test of equality of error variances was nonsignificant, $p = .43$. The results indicate that those observing the social exclusion of their ingroup reported having significantly lower levels of mood than those observing intergroup social inclusion, $F(1, 700) = 120.83$, $p < .001$, $\eta_p^2 = .14$, as described in Section 8.2.3. The main effect of the

intervention was nonsignificant, $F(2, 700) = 0.16, p = .85, \eta_p^2 < .001$. The interaction between vicarious intergroup exclusion and the intervention was also nonsignificant, $F(2, 700) = 0.75, p = .47, \eta_p^2 = .002$.

We next entered intergroup hostility as the dependent variable of the same model. Levene's test of equality of error variances was nonsignificant, $p = .46$. The results indicate that those observing the social exclusion of their ingroup indicated increased levels of intergroup hostility compared to those observing intergroup social inclusion, $F(1, 700) = 31.23, p < .001, \eta_p^2 = .03$, as described in Section 8.2.2. The main effect of the intervention was nonsignificant, $F(2, 700) = 0.23, p = .80, \eta_p^2 = .001$. The interaction between vicarious intergroup exclusion and the intervention was also nonsignificant, $F(2, 700) = 2.23, p = .11, \eta_p^2 = .01$.

Finally, we entered intergroup aggression as the dependent variable of the last analysis. Levene's test of equality of error variances was nonsignificant, $p = .22$. The results indicate that those observing the social exclusion of their ingroup engaged in increased levels of intergroup aggression compared to those observing intergroup social inclusion, $F(1, 700) = 13.83, p < .001, \eta_p^2 = .14$, as described in Section 8.2.2. The main effect of the intervention was nonsignificant, $F(2, 700) = 0.22, p = .80, \eta_p^2 = .001$. The interaction between vicarious intergroup exclusion and the intervention was also nonsignificant, $F(2, 700) = 1.13, p = .33, \eta_p^2 = .003$. A Bonferroni correction was applied to the latter two analyses, reducing the level of significance to $p < .025$. This way, the main effects of vicarious intergroup exclusion remained significant. These results overall do not support Hypothesis 8, likely resulting from the unsuccessful manipulation of fortifying emotion regulation (as described in Section 8.2.1).

8.3. Discussion

Study 4 tested Hypotheses 1 and 2 in a novel cultural context and intergroup setting. The data supported both hypotheses. They indicated that participants observing the social exclusion of their national ingroup held greater hostile intentions towards members of the excluding outgroup than participants allocated to a control social inclusion condition. Vicarious intergroup exclusion also increased symbolic aggression towards members of the excluding outgroup. Participants additionally reported lower levels of mood after observing the exclusion episode. Vicarious intergroup exclusion also had an indirect effect on both intergroup hostile intentions and aggression via impaired mood.

Study 4 further introduced two mindfulness meditation interventions, developed to fortify emotional resilience. Hypothesis 8 predicted that the interventions would alleviate the effects of vicarious intergroup exclusion on mood impairment, intergroup hostile intentions, and aggression by enhancing emotion regulation. The present data did not support this prediction. Moreover, the data indicated that the interventions did not work as intended. One of the interventions employed a classic audio-guided body scan, often used to train mindfulness (Kabat-Zinn, 2013). The other intervention combined the classic body scan with a cultivation of gratitude, an emotion also related to increased emotion regulation (Emmons & McCullough, 2003) and decreased interpersonal aggression (DeWall et al., 2012). However, neither interventions increased state mindfulness in comparison to a control condition. The mindful gratitude meditation was additionally expected to increase state gratitude compared to the classic body scan and the control condition, however there were no significant difference across the three groups.

The interventions were developed in collaboration with a certified mindfulness meditation trainer, and were informed by the scientific literature. Recent criticisms of the scientific studies exploring the effects of mindfulness meditation advise that conclusions from such studies should be drawn with caution (Anderson et al., 2019; Van Dam et al.,

2018). The methodologies and procedures of the studies are often not well controlled, and vary considerably across the studies. This makes it difficult to understand the exact mechanisms underlying the effects observed across different studies, all of which are attributed to mindfulness meditation. Such methodological limitations likely contributed to the absence of an effect in Study 4.

Across five studies, the research presented here investigated the effects of vicarious intergroup exclusion on mood impairment, intergroup hostile intentions, and aggression. Some discrepancy was observed across the result. In order to clarify these discrepancies, we next entered the data observed across the studies into a meta-analysis.

Chapter 9.

Meta-Analytic Summary of the Main Effects of Vicarious Intergroup Exclusion

Studies 1-4 investigated the predictions (Hypothesis 1) that vicarious intergroup exclusion increases intergroup hostile intentions and aggression, and (Hypothesis 2a) impairs mood. The results of these studies produced some inconsistencies with regards to Hypothesis 1. As the studies used similar methodologies and measures, this chapter reports a meta-analytic summary of the data presented across Studies 1-4 in order to clarify the effects of vicarious intergroup exclusion.

Furthermore, the studies were conducted under different intergroup contexts. Studies 1-2 employed a minimal group paradigm, using imaginary groups to create the intergroup context, while Studies 3-4 relied on existing, national groups. Whilst using imaginary groups has the advantage of controlling for pre-existing views about the groups, it is plausible that pre-existing attachment towards one's ingroup intensifies the effects of vicarious intergroup exclusion. Indeed, research suggests that the effects of interpersonal exclusion intensify when one perceives it to be because of their permanent, rather than temporary group membership (Wirth & Williams, 2009). For this reason, the meta-analytic summaries of the results included subgroup analyses, separated for the imaginary and real intergroup contexts. These analyses may yield valuable information on possible differences in effect sizes observed in the context of permanent and temporary intergroups. Thus, the present meta-analyses further aimed to explore whether the intergroup context influenced the consequences of vicarious intergroup exclusion. In order to account for further potential effects of variance in methodology, we additionally differentiated between online and laboratory studies across the analyses.

9.1. Method

We used Workbook 3 of Meta-Essentials (Suurmond et al., 2017) to conduct the meta-analysis. This workbook is designed specifically for calculating combined weighted effect sizes and confidence intervals of the effects of a certain variable observed in a between-participants design. It relies on the sample sizes of each group, along the means and standard deviations of the outcome variable of interest across the groups. Thus, we extracted the sample sizes, means, and standard deviations of mood, intergroup hostile intentions, and aggression across the groups allocated to the conditions of vicarious intergroup exclusion and social inclusion in Studies 1-4. We matched the scores of the mood and intergroup hostile intentions measures across the studies, due to variability in the scales used to assess them (Table 9.1). These sometimes ranged from 1 = *completely disagree* to 5 = *completely agree* (Studies 1a, 3), whereas others from 1 = *completely disagree* to 7 = *completely agree* (Studies 1a, 1b, 2, 4). We transformed each to fit a 1-7 Likert scale, standardizing the measurements across the studies.

Table 9.1

Mean Mood, Intergroup Hostile Intentions, and Aggression, Along Standard Deviations, Across the Conditions of Vicarious Intergroup Exclusion and Social Inclusion

Study	Group	N_{EX}	N_{IN}	Mood _{EX} : $M (SD)$	Mood _{IN} : $M (SD)$	HI _{EX} : $M (SD)$	HI _{IN} : $M (SD)$	Agg _{EX} : $M (SD)$	Agg _{IN} : $M (SD)$
1a	Imaginary	234	249	3.88 (1.54)	5.22 (1.34)	3.02 (1.23)	2.28 (1.11)	-	-
1b	Imaginary	162	157	4.38 (1.13)	5.36 (0.99)	2.53 (0.97)	2.15 (0.88)	0.35 (0.44)	0.25 (0.38)
2	Imaginary	38	35	4.14 (1.47)	5.06 (0.79)	1.74 (0.59)	1.69 (0.54)	0.32 (0.37)	0.28 (0.38)
3	Real	153	136	3.75 (1.50)	5.36 (1.11)	2.39 (1.15)	2.22 (0.96)	0.57 (0.63)	0.40 (0.54)
4	Real	348	358	3.98 (1.07)	4.81 (0.95)	3.01 (1.16)	2.59 (1.08)	0.69 (0.65)	0.51 (0.62)

Note. EX = Condition of vicarious intergroup exclusion. IN = Condition of social inclusion. HI = Hostile intentions. Agg = Aggression. M = Mean. SD = Standard deviation.

25 participants did not respond to the aggression measure in Study 3, thus the sample sizes for the analysis on aggression as the outcome variable were made up of $N_{EX} = 141$, $N_{IN} = 123$.

9.2. Results and Discussion

Each analysis was conducted using a random effects model. Hedges' g was chosen as the combined effect size of interest, as it corrects for the bias associated with Cohen's d (van Rhee et al., 2015). All results are presented in Table 9.2.

The results of the meta-analysis conducted on the overall effects of vicarious intergroup exclusion on mood indicated a large effect size. The confidence interval suggested the presence of a significant difference in mood reported by participants observing the social exclusion and social inclusion of their ingroup. However, the analyses indicate moderate heterogeneity. I^2 indicates that a considerable proportion of the observed variance was due to differences across the samples. In such a case, one should be careful when interpreting the combined confidence interval and effect size, as it may not be meaningful (van Rhee et al., 2015).

We next conducted separate meta-analyses on the effects of vicarious intergroup exclusion on mood according to the intergroup context employed in the study designs, i.e., created using real or imaginary groups, and according to methodology, i.e., online vs. laboratory data collection. The subgroup analyses indicate that the previously observed heterogeneity occurred in the context of real groups. The large heterogeneity observed among Studies 3 and 4 suggests that a large proportion of the observed effects may be due to variance across the samples, thus we do not interpret the related combined confidence interval and effect size here (van Rhee et al., 2015). This result holds important implications. Study 3 was conducted among US participants, whilst Study 4 was conducted among Polish participants. Cultural differences may underly the observed results. Additionally, the outgroup employed in Study 3 (Great Britain) is viewed positively among US nationals (McCarthy, 2020), whilst the outgroup employed in Study 4 (Ukrainians) are a minority group in Poland, and are viewed slightly more negatively overall (Polish Public Opinion

Research Center, 2019). Future studies should replicate the studies presented here in further cultural contexts, and across further intergroup settings to clarify the underlying differences.

The analyses revealed that the effects of vicarious intergroup exclusion on mood in the imaginary group context were large and significant. This was the case whether laboratory Study 2 was included in the analysis or not. The moderate heterogeneity observed in the analysis containing all studies disappeared here. The analysis indicates that studies conducted in the imaginary intergroup context were virtually completely homogenous. These results support Hypothesis 2a, predicting that vicarious intergroup exclusion impairs mood.

We next explored the effects of vicarious intergroup exclusion on intergroup hostile intentions. Although the overall combined effect was moderate and the combined confidence interval indicates the presence of a significant effect, the proportion of unexplained variance was moderate to large. This indicates that the studies may come from populations that are different from each other, confounding the results. The combined effect size and confidence interval may thus provide unreliable information (van Rhee et al., 2015).

We conducted separate subgroup analyses once again. However, the results indicate that proportion of unexplained variance remained moderate to large across the studies conducted in both the real and imaginary intergroup context. This was the case even after removing laboratory Study 2 from the analyses conducted in the imaginary intergroup context.

Study 1b, conducted in the imaginary context, manipulated the in- and outgroup's power and status. While belonging to a low-power, low-status group increased self-reported intergroup hostile intentions across the conditions of both vicarious intergroup exclusion and inclusion (this effect did not reach statistical significance), the status manipulation did not interact with the manipulation of vicarious intergroup exclusion. Nevertheless, based on the moderate heterogeneity observed here, it is likely that the manipulation did have unexpected

effects, influencing the data in different ways from that collected in the absence of status manipulation. It is further possible that the results are due to sampling error. However, as no similar heterogeneity was present when investigating the effects of vicarious intergroup exclusion on mood across the studies conducted in the imaginary intergroup context, sampling error is less likely. Because the observed results suggest that the samples did not belong to the same population, we refrain from interpreting the combined confidence intervals and effect sizes, as they may not provide meaningful results (van Rhee et al., 2015), and do not draw conclusions about Hypothesis 1a based on these results.

We finally entered into a meta-analysis the effects of vicarious intergroup exclusion on intergroup aggression. The combined effect size was small and significant. The results indicate that the samples were heterogenous. The subgroup analyses revealed that the combined small effect size remained significant in the context of real, but not imaginary groups. This suggests that the effects of vicarious intergroup exclusion may be more intense when occurring in the context of real groups. This is in line with previous results suggesting that the negative consequences of interpersonal exclusion increase in the context of permanent, rather than temporary group memberships (Wirth & Williams, 2009). This may be due to greater ingroup attachment and identification under such contexts.

The meta-analytic summaries presented here provide important information regarding the results observed throughout this thesis. They indicate that the results of vicarious intergroup exclusion on mood and hostility may differ across different cultural and intergroup contexts. This points towards future research directions, suggesting that further clarification of the influence of pre-existing intergroup relations and cultural differences should be sought.

Table 9.2*The Results of the Meta-Analyses*

	<i>N</i>	<i>k</i>	Hedges' <i>g</i>	<i>SE</i>	95% CI	<i>Q</i>	<i>I</i> ²
Mood – Overall	1,870	5	0.93	0.07	[0.74, 1.13]	7.09	44%
Mood – Real	995	2	1.00	0.19	[-1.45, 3.45]	6.65**	85%
Mood – Imaginary (All)	875	3	0.91	0.03	[0.77, 1.05]	0.42	< .01%
Mood – Imaginary (Online)	802	2	0.93	< 0.01	[0.87, 0.98]	< 0.01	< .01%
Hostility – Overall	1,870	5	-0.37	0.09	[-0.62, -0.12]	12.31*	67%
Hostility – Real	995	2	-0.29	0.11	[-1.63, 1.06]	2.36	58%
Hostility – Imaginary (All)	875	3	-0.44	0.14	[-1.05, 0.17]	5.81	66%
Hostility – Imaginary (Online)	802	2	-0.53	0.11	[-1.94, 0.88]	2.31	57%
Aggression – Overall	1,362	4	-0.26	0.02	[-0.34, -0.19]	0.60	< .01%
Aggression – Real	977	2	-0.28	< 0.01	[-0.31, -0.26]	< .01	< .01%
Aggression – Imaginary (All)	392	2	-0.22	0.05	[-0.90, 0.46]	0.28	< .01%

Note. N = sample size. k = number of studies. Hedge's g = estimate of combined effect size. SE = standard error of combined effect size. CI = confidence interval. Q = the weighted sum of squared differences between the observed effects and the weighted average effect. I^2 = proportion of unexplained variance.

PART III.
GENERAL DISCUSSION,
IMPLICATIONS, FUTURE DIRECTIONS

Chapter 10.

General Discussion, Implications, Future Directions

The research presented throughout this Ph.D. thesis investigated the consequences of vicarious intergroup exclusion, a form of social exclusion that concerns members of the ingroup, but does not directly target the individual (Veldhuis et al., 2014). Specifically, the first main objective of this thesis was to explore the effects of vicarious intergroup exclusion. Its second main objective was to understand the mechanism underlying these effects. The final main objective was to test interventions that may alleviate the negative consequences of vicarious intergroup exclusion. The secondary objective of this thesis was to clarify the factors that may further influence the effects of vicarious intergroup exclusion. We investigated the influence of the intergroup context, ingroup positivity, and the role of the type of outgroups targeted by the intergroup hostility and aggression, respectively. We experimentally tested 8 hypotheses corresponding to these objectives, using a multi-method approach in cross-cultural settings (Table 4.1). We subjected the results cumulated across the five experiments to meta-analyses. In this final chapter, we provide a brief summary of the research findings of the experimental studies. We then address each of the objectives in turn, interpreting the findings of the five experimental studies and the meta-analysis in more detail. The implications of these findings, the limitations of the research, and future research directions are then discussed.

10.1. Summary of Findings

Study 1a tested the prediction (Hypothesis 1a) that vicarious intergroup exclusion leads to increased intergroup hostile intentions. Participants were allocated to an imaginary nation and observed as members of their ingroup were excluded by members of an imaginary outgroup from an online ball-tossing game. Study 1a supported Hypothesis 1a. Study 1a further tested the predictions that vicarious intergroup exclusion impairs mood (Hypothesis

2a) and (Hypothesis 2b) that the increase in intergroup hostile intentions is driven by mood impairment. These hypotheses were also supported.

Study 1b employed an identical manipulation of vicarious intergroup exclusion. It replicated the findings of Study 1a. Study 1b additionally tested the effects of vicarious intergroup exclusion on intergroup aggression (Hypothesis 1b). The main effect of exclusion on aggression did not reach the level of statistical significance, although it was in the expected direction. However, vicarious intergroup exclusion was related to increased aggression indirectly, via mood impairment, supporting Hypothesis 2c.

Study 1b compared the indirect role of mood impairment in the relationships between vicarious intergroup exclusion and intergroup hostile intentions, and between vicarious intergroup exclusion and intergroup aggression to that of threatened fundamental psychological needs. Threat to fundamental psychological needs increased following vicarious intergroup exclusion, supporting Hypothesis 3a. However, the results indicate that the indirect effects of vicarious intergroup exclusion on intergroup hostile intentions and aggression occur only via impaired mood, but not need threat. This is not in line with Hypotheses 3b and 3c.

Finally, Study 1b extended Study 1a by including a manipulation of group status and power. It tested the prediction (Exploratory Hypothesis 4) that belonging to a low-status, low-power group whilst observing the ingroup's exclusion committed by members of a high-status, high-power outgroup intensifies the negative consequences. Group status and power did not influence the effects of vicarious intergroup exclusion on mood, intergroup hostile intentions, or aggression. These findings do not support Exploratory Hypothesis 4. However, group status did have a main effect on intergroup hostile intentions. Participants randomly allocated to a low-status, low-power group indicated increased hostile intentions towards

members of the high-status, high-power outgroup across the conditions of vicarious intergroup exclusion as well as inclusion.

Study 2 used the same manipulation of vicarious intergroup exclusion as Study 1a. It was conducted under laboratory conditions recruiting students from a UK university. It did not replicate the main effects of vicarious intergroup exclusion on intergroup hostile intentions and aggression. Thus, the results did not support Hypothesis 1. However, participants observing the exclusion of their ingroup did report significantly lower mood than those observing social inclusion, in line with Hypothesis 2a.

Study 2 introduced a non-invasive brain stimulation intervention. Participants were randomly allocated to undergo anodal transcranial Direct Current Stimulation (tDCS) or sham stimulation. The stimulation targeted the right ventrolateral prefrontal cortex (rVLPFC), a brain region related to emotion regulation, the downregulation of negative affect, and pain (Morawetz et al., 2017; Tupak et al., 2014; Vergallito et al., 2018; Wager et al., 2008). We predicted (Hypothesis 8) that through fortifying emotional resilience, this intervention would break the link between vicarious intergroup exclusion and mood impairment, increased intergroup hostile intentions, and aggression. This hypothesis was not supported by the data. The results of a manipulation check indicate opposite effects to those anticipated, suggesting that brain stimulation did not achieve the intended effects.

Studies 3 and 4 altered the intergroup context, employing national groups rather than imaginary groups in the ball-tossing game. This way, we could explore whether the observed effects generalize across intergroup contexts, or whether identification with a temporary or permanent group might influence them in different ways. Studies 3 and 4 were conducted in different cultural contexts in order to investigate cross-cultural generalizability of the findings.

Study 3 was conducted among US participants. The intergroup context was created with a national outgroup viewed favourable by Americans, Great Britain (McCarthy, 2020). In this cultural context, the prediction (Hypothesis 1a) that vicarious intergroup exclusion increases intergroup hostile intentions was not supported. However, the data do indicate that vicarious intergroup exclusion led to an increase in intergroup aggression, as predicted (Hypothesis 1b). Vicarious intergroup exclusion further impaired mood, as predicted (Hypothesis 2a). Despite the lack of a main effect, vicarious intergroup exclusion did lead to increased hostile intentions indirectly, via mood impairment (Hypothesis 2b). The same indirect effect was not observed in the case of intergroup aggression (Hypothesis 2c).

Study 3 additionally investigated the moderating effects of ingroup positivity. We hypothesised that collective narcissism, a belief that the ingroup is exceptional but not sufficiently recognized (Golec de Zavala & Lantos, 2020), would predict (Hypothesis 5a) increased intergroup hostility and (Hypothesis 5b) aggression following vicarious intergroup exclusion. We controlled for ingroup satisfaction across the analyses, a secure form of ingroup positivity that has been found to correlate with collective narcissism across studies, but to predict different intergroup behaviour (Golec de Zavala, Dydych-Hazar, et al., 2019; Leach et al., 2008). Study 3 supported Hypothesis 5a, but not 5b.

In an exploratory manner, we tested whether the effects of vicarious intergroup exclusion may be similarly influenced by other forms of ingroup positivity as well. Specifically, we explored the moderating role of ingroup satisfaction, controlling for its overlap with collective narcissism (Exploratory Hypothesis 6). The results of the analyses indicate that ingroup satisfaction did not influence the effects of vicarious intergroup exclusion on intergroup hostile intentions or aggression. However, across the conditions of intergroup exclusion and inclusion, ingroup satisfaction was related to reduced intergroup

hostility, suggesting that more adaptive and prosocial intergroup relations are related to secure ingroup positivity.

Finally, Study 3 investigated the nature of the hostile and aggressive consequences of vicarious intergroup exclusion. In an exploratory manner, we tested whether vicarious intergroup exclusion may lead to greater levels of retaliatory intergroup hostile intentions and aggression, targeting members of the excluding outgroup, than displaced hostility and aggression, targeting members of a neutral outgroup that did not engage in the ingroup's exclusion (Exploratory Hypothesis 7). We observed no significant differences in intergroup hostile intentions or aggression following vicarious intergroup exclusion towards members of the excluding or neutral outgroup.

Study 4 was conducted among Polish participants. To create the intergroup context, we relied on a minority national group in Poland, perceived with slightly negative attitudes across the Polish population, Ukrainians (Polish Public Opinion Research Center, 2019). In this intergroup context, we found support for Hypothesis 1, predicting that vicarious intergroup exclusion increases intergroup hostile intentions and aggression. The results also supported Hypothesis 2, indicating that vicarious intergroup exclusion impaired mood, and led to increased intergroup hostile intentions and aggression indirectly, via the mood impairment.

Study 4 introduced two mindfulness meditation interventions to alleviate the negative effects of vicarious intergroup exclusion. Mindfulness refers to receptive attention occurring moment to moment, both internally and external (Martelli et al., 2018). It is non-judgemental, and entails no necessity to react to the internal and external events. The practice of mindfulness meditation fosters mindful attention, and has been related to increased emotion regulation and resilience to threat, as well as to a decrease in aggression following provocation (DeSteno et al., 2018; Kemeny et al., 2012; Kok et al., 2013; Slutsky et al.,

2017). Recent criticisms of the research surrounding mindfulness suggest, among others, that the large variability in the mindfulness interventions employed in previous empirical studies hinders the generalizability of the observed data (Van Dam et al., 2018). Thus, we developed two meditation interventions in cooperation with a certified mindfulness trainer. We investigated how participants undergoing the brief mindfulness meditation interventions may respond to vicarious intergroup exclusion compared to each other and to participants randomly allocated to a control condition.

We predicted (Hypothesis 8) that undergoing a mindfulness meditation intervention before observing the exclusion of ingroup members would break the link between vicarious intergroup exclusion and impaired mood, intergroup hostile intentions, and aggression, by increasing emotional resilience. The results of Study 4 did not support this prediction. In fact, manipulation checks revealed that the mindfulness meditations likely did not achieve the desired effects: participants undergoing the mindfulness meditation interventions did not report significantly different levels of state mindfulness afterwards than participants of a control group.

We finally entered the differences observed across the five experiments in mood, intergroup hostile intentions, and aggression, between participants randomly allocated to the condition of vicarious intergroup exclusion and inclusion to meta-analyses. In the case of mood, all five experimental studies indicated a significant effect of vicarious intergroup exclusion. The combined effect size of these studies was large and significant. However, assessment of heterogeneity suggested that a considerable amount of variance was observed across the samples. Thus, relying on the combined effect size and confidence interval may lead to biased conclusions. Subgroup analyses revealed that the variation across populations was present in the studies using a real, but not imaginary intergroup context. In the imaginary intergroup context, the effects of vicarious intergroup exclusion on mood were consistently

significant, whether including laboratory Study 2 in the meta-analysis, or only online Studies 1a and 1b, with a large combined effect size, and homogenous samples. However, heterogeneity across Studies 3 and 4 was so severe ($I^2 = 85\%$), that we refrained from further interpreting the combined results (van Rhee et al., 2015).

Vicarious intergroup exclusion led to an increase in intergroup hostile intentions in three (Studies 1a, 1b, 4) out of the five studies testing Hypothesis 1a. The meta-analytic summary of the data across all samples suggested a significant relationship with a moderate combined effect size. However, the results indicated that moderate to large heterogeneity existed across the samples, and thus the combined results may not be reliably interpreted. A moderate to large heterogeneity remained present when conducting subgroup analyses of the data observed in the context of existing national groups, as well as imaginary groups (with and without the inclusion of laboratory Study 2). Combined effect sizes and confidence intervals related to the analyses were thus not interpreted.

Vicarious intergroup exclusion was related to an increase in intergroup aggression in three out of the four the experiments testing this relationship. A meta-analytic summary indicated that the combined effect was significant, with a small effect size. Subgroup analyses revealed that the combined effect remained significant only in the context of real, but not imaginary intergroup contexts, with a small combined effect size. These results suggest that vicarious intergroup exclusion in the context of real groups has a more pronounced effect on intergroup aggression than in the context of imaginary groups.

10.2. The Main Effects of Vicarious Intergroup Exclusion

The five experimental studies presented throughout this thesis tested the main effects of vicarious intergroup exclusion on intergroup hostile intentions (Studies 1-4), intergroup aggression (Studies 1b-4), mood (Studies 1-4), and need threat (Study 1b). In each of the experiments, participants were randomly allocated to either observing as members of their

ingroup were excluded from an online ball-tossing game by members of an outgroup, or the inclusion of their ingroup during the game. Manipulation check measures implemented across the experiments consistently indicated that the mere observation of the exclusion of one's ingroup members leads to an experience of personal exclusion. This is a crucial finding, as it indicates that the exclusion of ingroup members affects individuals on a personal level. The experience of personal exclusion was present following a trivial form of exclusion, with no real-world consequences. It is likely that the related effects are even more pronounced when the exclusion episode is more severe and holds real-world consequences.

Individuals readily categorize not only others, but also themselves into groups (Brewer, 2001; Tajfel & Turner, 1979). Through ingroup identification, the ingroup becomes a part of one's self-concept (Smith, 1993). Indeed, studies cumulated both behavioural (Coats et al., 2000; Smith et al., 1999) and neuroscientific data (Molenberghs & Louis, 2018; Scheepers et al., 2013; Scheepers & Derks, 2016) supporting the overlapping mental representation of the self and the ingroup. This mental overlap likely underlies the observed effects: Events concerning the ingroup also concern the self, even when the individual is not directly affected. Moreover, as studies suggest that the effects of social exclusion intensify when exclusion is attributed to one's group membership (Bernstein et al., 2010; Wirth & Williams, 2009), it is likely that this type of vicarious intergroup exclusion leads to similarly severe consequences. Indeed, research suggests that the mere observation of the exclusion of one's ingroup may lead to a personal experience of humiliation, powerlessness, and anger (Veldhuis et al., 2014), and has been related to intergroup aggression (Golec de Zavala, Federico, et al., 2019).

In line with this, across each of the five studies we observed that vicarious intergroup exclusion leads to mood impairment. A meta-analytic summary of the data revealed a large combined effect size, however suggested heterogeneity across the data. Subgroup analyses

indicated that the heterogeneity lies across the samples of Studies 3 and 4, conducted in the context of existing national groups. We consider the reasons behind this heterogeneity further in Section 10.5.1. Across all studies conducted in the context of imaginary groups, the results indicated a large and significant combined effect of vicarious intergroup exclusion on mood. Study 1b further suggested that vicarious intergroup exclusion increased threat to one's fundamental psychological needs. These include self-esteem, the need to belong, control, and meaningful existence. Research indicates that personal exclusion similarly impairs mood and threatens fundamental psychological needs (Williams & Nida, 2011; Wirth & Williams, 2009), supporting that the observed exclusion of the ingroup may be experienced on the personal level.

Vicarious intergroup exclusion led to increased hostile intentions in three out of the five studies examining this effect (Studies 1a, 1b, 4), while it led to increased intergroup aggression in three out of the four studies testing this effect (Studies 1b, 3, 4, the results of Study 1b not reaching statistical significance). This is also in line with the effects of interpersonal exclusion, related to an increase in subsequent aggression (Chester & DeWall, 2017; Ren et al., 2018). These results also replicate the finding that vicarious intergroup exclusion is related to intergroup aggression (Golec de Zavala, Federico, et al., 2019). However, the effects of vicarious exclusion on intergroup hostile intentions and aggression were not consistent across all studies.

A meta-analytic summary of the effects of vicarious intergroup exclusion on intergroup hostility revealed significant heterogeneity across the samples, hindering the interpretation of the combined effect sizes and confidence intervals. The heterogeneity remained present when conducting subgroup analyses between the experiments conducted in the context of real and imaginary groups. The heterogeneity was present even after removing

laboratory Study 2 from the analysis, in an attempt to investigate only the effects observed through online data collection.

While in Study 4, the national outgroup comprised a minority group, in Study 3 it was a group perceived particularly favourably by participants. Exclusion in the ball game by a favoured group may have been perceived as less severe by participants, accounting for the lack of subsequent increase in hostile intentions in Study 3. This is further discussed in Section 10.5.1. Study 2 was conducted among a sample of university students, many of whom were enrolled in psychology degrees. This indicates that the absence of the observed effect may have been caused by sampling error. It is possible that the students had considerable background knowledge about the nature of psychological experiments compared to naïve participants, while they likely also had more experience in taking part in experiments. Furthermore, Study 2 employed a non-invasive brain stimulation intervention. In order to comply with ethical and safety guidelines, an experimenter was present at all times during the testing sessions. All other studies presented throughout this thesis were conducted online. The presence of the experimenter could unintentionally confound the results by (consciously or not) motivating participants to comply with social norms and thus to *not* report wanting to engage in hostility towards others.

The meta-analysis of the effects of vicarious intergroup exclusion on aggression revealed a small but significant combined effect size. Subgroup analyses showed that the small but significant combined effect remained present in the context of real, but not imaginary groups. These results suggest that exclusion may have a stronger effect on aggression in the context of existing groups (further discussed in Section 10.5.1). Indeed, in Study 1b, conducted in the imaginary group context, the effects vicarious intergroup exclusion on aggression were in the anticipated direction, but did not reach significance. The

nonsignificant effect observed in Study 2 could have also been caused by the imaginary intergroup setting.

Additionally, as detailed above, it is also likely that the sample of university students recruited in Study 2 were not representative of the general population. They may further have been influenced by the presence of the experimenter during the experiment. Notably, to operationalize intergroup aggression in Study 2, participants were presented with a voodoo doll representing an outgroup member, and were instructed to stab it with as many pins as they would like (DeWall et al., 2013). Although the online experiments used the same operationalisation, in its online version participants simply indicate the number of pins they would hypothetically use to stab a voodoo doll, but do not engage in actual stabbing behaviour. There is thus a possibility that the difference in methodology contributed to the inconsistency across the findings related to the effects of vicarious intergroup exclusion on aggression.

10.3. The Mechanism Underlying the Effects of Vicarious Intergroup Exclusion

The results of the studies presented throughout this thesis indicate that, at least under some circumstances, vicarious intergroup exclusion increases intergroup hostile intentions and aggression. We aimed to gain a better understanding of this relationship, as such an understanding would allow the development of informed interventions. Each of the five studies presented here found that vicarious intergroup exclusion impairs mood. Negative affect is associated with increased aggression (Berkowitz, 1993; Berkowitz & Thome, 1987), while the relationship between interpersonal exclusion and aggression is mediated by mood impairment (Chester & DeWall, 2017). Across Studies 1a, 1b, 3, and 4, we tested the prediction that the relationship between vicarious intergroup exclusion and intergroup hostile intentions occurs via mood impairment. The data observed in each of the studies supported

this hypothesis. The indirect effect of exclusion on intergroup hostile intention via mood impairment was even significant when its main effect was not (Study 3).

Studies 1b, 3, and 4 also examined the indirect effects of vicarious intergroup exclusion on intergroup aggression via mood impairment. The results of Studies 1b and 4 supported this indirect effect. Though the results of Study 3 indicated a main effect of vicarious intergroup exclusion on aggression, its indirect effect via mood was absent. Study 3 was the only one conducted in a US sample. It is possible that cross-cultural differences influenced the results. Future research should explore potential cross-cultural effects further. It is additionally possible that the lack of the indirect effect in Study 3 was due to the intergroup context employed there. This is further discussed in Section 10.5.1.

It has been proposed that the function of aggression following interpersonal social exclusion is to repair the threat that has occurred to fundamental psychological needs (Ren et al., 2018; Williams, 2009; Williams & Nida, 2011). Under this assumption, it was suggested that aggressive behaviour would prompt a response from its target, making the aggressor feel less invisible (need for meaningful existence), while it may make them feel in control (need for control). To test whether the indirect effects of vicarious intergroup exclusion on intergroup hostility and aggression happen uniquely via mood impairment, we compared them to indirect effects via need threat in Study 1b. The results indicated that while the indirect effects via mood were significant in the cases of hostility and aggression, those via need threat were not. These findings hold important theoretical implications, and indicate that future work in the interpersonal domain as well should explore the role of mood impairment.

10.4. Fortifying Emotion Regulation to Alleviate the Effects of Vicarious Intergroup Exclusion

The data collected throughout this thesis suggest that mood impairment underlies the effects of vicarious intergroup exclusion on intergroup hostile intentions and (at least under some circumstances) aggression. This finding points towards ways in which the negative consequences of vicarious intergroup exclusion may be counteracted. We tested the effects of interventions aiming to alleviate the effects of vicarious intergroup exclusion on mood, intergroup hostile intentions, and aggression by fortifying emotion regulation. Through this, we anticipated that individuals would be more equipped to downregulate the arising negative affect related to the subsequent hostility and aggression.

Study 2 used a tDCS intervention to enhance activity in the rVLPFC, a brain region associated with emotion regulation, the regulation of physical pain, and the downregulation of negative emotions related to threat perception (Morawetz et al., 2017; Tupak et al., 2014; Wager et al., 2008). Participants received tDCS or sham stimulation before and during an episode of vicarious intergroup exclusion. Earlier experiments using similar anodal tDCS stimulation of the rVLPFC indicate that the stimulation alleviated the negative effects of interpersonal social exclusion on mood and interpersonal aggression (Riva et al., 2012; Riva, Romero Lauro, DeWall, et al., 2015). However, the effects of brain stimulation were not in line with our predictions in Study 2. In fact, the main effects of brain stimulation were in the opposite direction from what we anticipated on our manipulation check measure and on the measure of hostile behavioural intentions. They further did not interact on any of the main dependent variables with the manipulation of vicarious intergroup exclusion.

It is unclear why we failed to replicate previous results. It is possible that the shift in our paradigm from the interpersonal to the intergroup setting was responsible for the differences between the results of Study 2 and those reported previously (Riva et al., 2012; Riva, Romero Lauro, DeWall, et al., 2015). Alternatively, unanticipated confounding factors may have influenced the present results. TDCS is a relatively new technology, and our

understanding of its effects is not yet complete. Cumulating evidence indicates that there are still gaps in our knowledge with regards to a number of factors, including the exact effects of sham stimulations or the way that hair thickness or cortical thickness may affect the electric current reaching the cortex. Indeed, increasingly, issues with replicability are being reported (Berker et al., 2013; Fonteneau et al., 2019; Héroux et al., 2017; Horvath et al., 2014; Riggall et al., 2015).

Study 4 utilized two mindfulness meditations as the intervention aiming to fortify emotion regulation, and to thus alleviate the negative consequences of vicarious intergroup exclusion. Mindfulness meditation refers to a receptive attention towards events that occur internally and externally, at all times, without judgment or a necessity to react to those events (Martelli et al., 2018). Mindfulness is related not only to increased emotion regulation (Boyle et al., 2017; Garland et al., 2015; Wheeler et al., 2017), but also to resilience to adversity (Kemeny et al., 2012; Kok et al., 2013; Porges, 2007), and threat (Brown et al., 2012, 2013). Trait mindfulness leads to reduced activity in pain related brain regions during interpersonal social exclusion (Martelli et al., 2018), while mindfulness training has been associated with faster mood recovery following interpersonal social exclusion (Keng & Tan, 2018; Molet et al., 2013).

Participants in Study 4 were randomly allocated to completing a 10-minute long audio-guided mindfulness meditation or a 10-minute long audio-guided mindful gratitude meditation before observing the social exclusion or inclusion of their ingroup, or to a control condition. The results of the experiment did not support the prediction that mindfulness meditation practice would alleviate the negative effects of vicarious intergroup exclusion on mood, intergroup hostile intentions, or aggression. Participants completed manipulation check measures of state mindfulness and gratitude. The results indicate that there were no significant differences in either measure across the three groups. Thus, it is likely that the

meditations did not work in the intended way. In this case, they likely did not result in increased emotion regulation.

The mindfulness meditation interventions were developed with a certified mindfulness trainer. Although they were informed by previous research, recent criticisms of research on the effects of mindfulness meditation suggest that due to extensive variability in the types of meditation used, any conclusions based on previous findings should be drawn with care (Van Dam et al., 2018). While some work indicates that as little as a single 10-minute long mindfulness meditation practice may produce effects (Norris et al., 2018; Seppala et al., 2014), others involve as much as 20-26 hours of formal training across 8 weeks (1-2.5 hours/session; Kabat-Zinn, 2013). The length and frequency of mindfulness training reported in previous work has been found to vary anywhere between these extremes (Van Dam et al., 2018). It is possible that a longer period of mindfulness practice or multiple sessions of mindfulness meditation would lead to the effects we aimed to achieve here.

Furthermore, the present mindfulness meditation practices were implemented online. We thus had no way of controlling that participants truly followed the instruction carefully. Different outcomes may appear in an in-person setting. Similarly, the type of mindfulness meditations used across published studies also varies greatly (Van Dam et al., 2018). This hinders the development of novel research, as the effects observed in previous research may be due to different underlying mechanisms. Due to these reasons, we cannot exclude the possibility that different types of mindfulness meditation may produce different results from those observed here. Future research should investigate this possibility.

10.5. The Conditions Influencing the Effects of Vicarious Intergroup Exclusion

10.5.1. The Role of the Intergroup Context

Apart from investigating the effects of, the mechanisms underlying, and the interventions alleviating vicarious intergroup exclusion, this thesis aimed to clarify the

conditions that may further influence how vicarious intergroup exclusion affects mood, intergroup hostile intentions, and aggression. Research suggests that belonging to minority or majority groups as one experiences social exclusion due to their group membership does not influence its effects (Schaafsma & Williams, 2012). Yet marginalized groups experience increased levels of prejudice, predisposing them to respond with increased sensitivity to such experiences (Schmitt & Branscombe, 2002a, 2002b). We introduced a manipulation of group status, i.e., social prestige, and power, i.e., increased control over resources (Fiske et al., 2016), in Study 1b. Participants were either allocated to a high-status, high-power, or to a low-status, low-power group as they observed the social exclusion or inclusion of their ingroup members whilst interacting with members of the opposite (i.e., low-status, low-power, or high-status, high-power) outgroup.

The results suggested that group status did not influence the effects of vicarious intergroup exclusion on mood, intergroup hostile intentions, or aggression. However, participants were allocated to minimal groups in Study 1b. It is possible that those experiencing marginalization in the real world would respond more sensitively to the effects of group-status and group-power. Thus, future research should replicate Study 1b in the context of existing groups.

The results of Study 1b additionally indicate that a different process may occur following status and power manipulation. Participants across the conditions of intergroup exclusion and inclusion responded with increased hostility when allocated to a low-status group membership. Previous research indicates that low socioeconomic status is related to aggression, even when controlling for individual difference measures including the dark tetrad or the big five personality traits (Greitemeyer & Sagioglou, 2016). Relative deprivation theory suggests that lower socioeconomic status, also related to status and power, causes individuals to experience a disadvantage. This perceived disadvantage may in turn translate

into aggression. Similar effects in Study 1b were not observed on the aggression measure. Hostile intentions may precede aggressive behaviour on the cognitive level (Anderson & Bushman, 2002). It is possible that the hostile intentions would turn into overt aggression under more realistic intergroup settings and status differences. However, based on these results, it is likely that group status and power would not interact with the experience of vicarious social exclusion, but rather affect intergroup aggression irrespective of it.

Studies 1 and 2 were conducted in a minimal group setting. Employing a minimal group paradigm holds the advantage over creating an intergroup context involving real groups that it controls for pre-existing beliefs and attitudes about the in- and outgroups, thus allowing one to gain a clearer understanding of intergroup relations (Tajfel & Forgas, 1981). However, research suggests that attributing personal social exclusion to a permanent rather than temporary group membership increases its effects (Wirth & Williams, 2009). Thus, in order to assess similarities and differences among the effects of vicarious intergroup exclusion conducted in the context of permanent and temporary groups, Studies 3 and 4 were conducted in the context of existing national groups.

Meta-analytic summaries based on the effects of vicarious intergroup exclusion on mood and hostile intentions revealed that the samples of Studies 3 and 4 were heterogeneous (Table 9.2). Study 3 was conducted among US participants. The outgroup chosen in the experiment was a national group viewed favourably by Americans, Great Britain (McCarthy, 2020). Study 4 was conducted among a sample of Polish participants. The outgroup chosen in the experiment was a minority national group, towards whom 41% of Poles reported a negative, 31% a positive view in a recent survey. The heterogeneity across these samples indicates that the intergroup context, i.e., pre-existing views of the outgroup and existing intergroup relations, may influence the effects of vicarious intergroup exclusion. The

variance may alternatively be attributed to cultural differences. Future research should investigate this matter further.

The meta-analytic summary of the effects of vicarious intergroup exclusion on hostile intentions additionally revealed variance among the samples of studies conducted in the imaginary intergroup context (Studies 1a, 1b, 2). This heterogeneity remained after removing the data of Study 2, conducted in a laboratory setting, rather than online. Studies 1a and 1b used the same manipulation of the intergroup context, employing a minimal group paradigm. Study 1b additionally manipulated the group status and power attributed to the in- and outgroup. Although the status and power manipulation did not interact with the effects of exclusion, it did have a main effect on hostile intentions, as detailed above. Thus, the manipulation of group status and power might account for the variance. Future research should take this into consideration.

The meta-analytic summary of the effects of vicarious intergroup exclusion on intergroup aggression suggest that aggression increased significantly following exclusion in the context of real, but not imaginary groups. This is in line with previous research indicating that attributing exclusion to a permanent group membership increases its effects compared to attributing it to a temporary group membership (Wirth & Williams, 2009). Ingroup identification leads to an integration of the group into one's self-concept (Brewer, 2001; Tajfel & Turner, 1979). The identification is likely stronger in the case of existing groups. Permanent group memberships, unlike temporary ones, are additionally unchangeable, potentially contributing to the increased effects of exclusion. Thus, while employing minimal group paradigms in the context of vicarious intergroup exclusion can lead to informative results, in order to draw conclusions about intergroup behaviour in the real world, relying on existing group memberships may produce more reliable data.

10.5.2. The Moderating Role of Antagonistic Ingroup Positivity

Collective narcissism refers to a grandiose view of the ingroup, characterised by resentment for a perceived lack of the ingroup's recognition (Golec de Zavala, Dyduch-Hazar, et al., 2019; Golec de Zavala & Lantos, 2020). It is related to a hypersensitivity to any (real or perceived) signs that the ingroup is devalued, and to aggression and hostility towards those who threaten the image of the ingroup. In the intergroup setting, collective narcissism often predicts behaviour that is analogous to that predicted by trait narcissism in the interpersonal setting (Golec de Zavala, Dyduch-Hazar, et al., 2019). However, collective narcissism uniquely predicts intergroup behaviour. Previous research indicates that individuals high in trait narcissism respond with increased aggression following interpersonal social exclusion, but that they do not report increased levels of mood impairment (Cascio et al., 2015; Chester & DeWall, 2016a; Twenge & Campbell, 2003). We anticipated that collective narcissism would be related to similar results in the context of vicarious intergroup exclusion.

Specifically, Hypothesis 5 predicted that individuals endorsing collective narcissistic beliefs would respond to vicarious interpersonal exclusion with increased hostile intentions and aggression. Study 3 tested this prediction. We controlled for ingroup satisfaction across the analyses. Ingroup satisfaction refers to a secure form of ingroup positivity, characterised by pride towards the group and towards being its member, that is noncontingent upon external recognition (Leach et al., 2008). Although collective narcissism and ingroup satisfaction have been positively correlated across studies, they predict opposite intergroup behaviour (Dyduch-Hazar et al., 2019; Golec de Zavala, 2019; Golec de Zavala, Dyduch-Hazar, et al., 2019; Golec de Zavala, Federico, et al., 2019). The results of Study 3 revealed that, as expected, collective narcissism was related to increased levels of intergroup hostile intentions following vicarious intergroup exclusion. However, it did not predict increased aggression following vicarious intergroup exclusion. While intergroup aggression in Study 3

was significantly higher after vicarious intergroup exclusion than inclusion, intergroup hostile intentions were not. It is thus possible that collective narcissism is related to increased hostility following vicarious intergroup exclusion only when the hostility does not increase across the population, but that it does not lead to a further increase in aggression when it is already elevated across the population.

In order to clarify whether such an increase in hostility is unique to collective narcissism, or whether it may be related to other forms of ingroup positivity as well, we conducted exploratory analyses to examine the moderating role of ingroup satisfaction. It may be the case that any indicators of increased positivity and attachment lead to increased sensitivity to vicarious intergroup exclusion. Exploratory Hypothesis 4 predicted that ingroup satisfaction would be related to increased intergroup hostility and aggression following vicarious intergroup exclusion. Across the analyses, we controlled for the overlap between ingroup satisfaction and collective narcissism.

The results of Study 3 did not support this prediction. This indicates that the increased hostility following vicarious intergroup exclusion is unique to antagonistic forms of ingroup positivity. However, we did observe a main effect of ingroup satisfaction on intergroup hostile intentions. Ingroup satisfaction predicted intergroup hostile intentions negatively across the conditions. This effect was only visible when collective narcissism and target outgroup were entered as covariates in the model. This suggests that secure forms of ingroup positivity are related to less hostility and more adaptive intergroup relations, and supports previous research indicating that collective narcissism and ingroup satisfaction may be related to opposite behaviours (Dyduch-Hazar et al., 2019; Golec de Zavala, Federico, et al., 2019). In order to observe these opposite behaviours, it may be necessary to control for the overlap between the variables. It is also in line with findings suggesting that ingroup

satisfaction is uniquely associated with positive emotionality and prosociality (Golec de Zavala, 2019).

Here, we examined the moderating effects of two types of ingroup positivity. The results suggest that while antagonistic ingroup positivity is related to increased hostility following vicarious intergroup exclusion, secure ingroup positivity is not. In order to gain a more thorough understanding of the moderating role of ingroup positivity, it is recommended that future research compares these results to further types of ingroup positivity as well. As the findings throughout this thesis indicate that the intergroup context may influence the effects of vicarious intergroup exclusion (Section 10.5.1), it is additionally recommended that future research explores whether different intergroup contexts may further influence these effects.

10.5.3. Aggression Towards ‘Innocent’ Outgroups

Research suggests that in the interpersonal domain, social exclusion not only leads to retaliatory, but also to displaced aggression (DeWall, Twenge, et al., 2010; Rajchert et al., 2017; Twenge et al., 2001; Twenge & Campbell, 2003). To our knowledge, no previous experiments have directly compared the extent of retaliatory to that of displaced aggression following vicarious intergroup exclusion. Some have theorized that aggression holds a mood restoring function by increasing positive affect, and suggested that aggression following social exclusion may serve to restore the impaired mood (Chester, 2017; Chester & DeWall, 2017). However, only provoked, but not nonprovoked aggression has been related to hedonistic positive affect (Chester & DeWall, 2016b; Ramírez et al., 2005).

Study 3 explored whether aggression following vicarious intergroup exclusion may lead to more retaliatory intergroup hostility and aggression targeting a member of the excluding outgroup, than displaced intergroup hostility and aggression, targeting a member of a neutral outgroup, not responsible for the exclusion. The results suggest that there were no

significant differences in the extent to which participants engaged in intergroup hostility or aggression following the exclusion episode towards members of the ostracizing vs. a neutral outgroup. Importantly, aggression increased towards members of the excluding outgroup and towards members of a neutral outgroup in Study 3. This finding has important implications. Translated to a real-world context, it suggests that following the ingroup's observed exclusion, individuals are motivated to aggress towards members of any outgroup, shedding light on a potential catalyst of intergroup hostility.

10.6. Implications

Previous research suggests that the political and economic exclusion of groups leads to detrimental consequences, including intergroup conflict and violence (Choi & Piazza, 2016; Crenshaw, 1981; Regan & Norton, 2005; Wimmer et al., 2009). The data presented throughout this thesis indicate that such exclusion may lead to intergroup hostility and aggression even in the absence of its direct experience. Intergroup exclusion may be experienced vicariously, leading to similarly severe consequences as personal social exclusion. Crucially, the data further indicate that vicarious intergroup exclusion may lead not only to retaliatory aggression, targeting members of the excluding outgroup, but also displaced aggression, targeting members of a neutral outgroup. The research presented here further provides a framework for understanding how such exclusion leads to intergroup hostility and aggression, and gives insights into some additional factors that may influence vicarious intergroup exclusion.

Only scarce research previously investigated vicarious intergroup exclusion (Golec de Zavala, Federico, et al., 2019; Veldhuis et al., 2014). The results of this more comprehensive research project indicate that it may hold severe consequences for intergroup relations. Thus, this research has important theoretical and applied implications, shedding light on psychological mechanisms that should be further explored. The data presented here indicate

that the relationship between vicarious intergroup exclusion and intergroup hostility, as well as that between vicarious intergroup exclusion and (at least in some cases) intergroup aggression may happen indirectly, via mood impairment. By understanding the process through which such effects occur, it is possible to develop interventions aiming to reduce or prevent the intergroup conflict related to vicarious intergroup exclusion. Even though the interventions tested here were not successful in achieving this aim, it is our hope that future research can build on the present findings and pursue it further.

Indeed, an understanding of the processes detailed here and the future development of interventions aiming to equip individuals to more adaptively deal with the experiences of vicarious intergroup exclusion are timely and important tasks. The present findings hold the potential to inform social scientists, policy makers, governments, and even those working in clinical settings. With the growing support for right-wing populism, narratives of the ingroup's relative deprivation are prevalent across countries (Golec de Zavala & Keenan, 2020; Kaltwasser, 2012). Populist rhetoric often further promotes xenophobia and the social exclusion of other outgroups (Rooduijn & Akkerman, 2017).

Such cross-cultural narratives should be noted and handled with care. The present findings indicate that politicians and the media have great responsibility in how they frame social processes in their communications. When such communications focus on the excluding nature of intergroup relationships, they may lead to the escalation of intergroup hostility and aggression, even unintentionally. Members of a group whose exclusion is highlighted in this way may be motivated to engage in hostility and aggression towards (both excluding and 'innocent') outgroup members, even in the absence of personally experiencing the exclusion. Thus, the present results hold valuable details that can be implemented as societies aim to prevent or reduce intergroup conflict and promote intergroup peace.

Striving to foster intergroup peace holds economic benefits for societies as well. The economic costs related to violence globally totalled to \$14.76 trillion in 2017 alone, with the largest proportion (37%) spent on military expenditures (The Institute for Economics & Peace, 2018). A decrease in intergroup conflict is anticipated to be related to decrease in such extreme figures. With societies facing further great challenges (e.g., climate change, the COVID-19 pandemic), such costs could be turned to addressing other pressing issues, further increasing the wellbeing of societies and individuals.

Research on the interpersonal effects of social exclusion indicate that such experiences are related to adverse consequences. Prolonged experiences of social exclusion affect both psychological and physical health negatively, and, among others, lead to experiencing life as meaningless, to suicidal ideation, and even suicide (Bernstein, 2016; Eisenberger, 2013; Hames et al., 2018; MacDonald & Leary, 2005; Stillman et al., 2009). This project suggests that the mere observation of the exclusion of one's ingroup members affects individuals on a personal level. The data suggest that similar adverse effects on mental and physical health may be experienced as a consequence of vicarious intergroup exclusion. Future research should examine this possibility further, as its scientific confirmation would yield important information for clinical mental health practitioners as well.

This research project further holds methodological implications for the research community focusing on the topics of social exclusion or intergroup processes. Across the five studies presented here, we demonstrated that the adapted version of the Cyberball paradigm (Williams et al., 2000; Williams & Jarvis, 2006) can be used to induce the experience of vicarious intergroup exclusion under laboratory conditions and online, across different national contexts. The manipulation works using both imaginary and existing intergroup settings.

10.7. Limitations and Future Directions

The present research is not without limitations. Notably, we only used one method, the Cyberball paradigm (Williams et al., 2000; Williams & Jarvis, 2006), for experimentally manipulating vicarious intergroup exclusion. Future experiments should clarify whether the results presented here replicate under different manipulations of vicarious intergroup exclusion. It is likely that the effects of vicarious intergroup exclusion would intensify under conditions where the exclusion episode could hold real-world consequences, while the paradigm used here manipulated exclusion in a way that did not imply such consequences.

Furthermore, we relied on only one measure of intergroup hostile intentions and one measure of aggression throughout this project. We inferred intergroup hostility throughout this thesis based on participants' self-reported hostile intentions towards outgroup members (Mackie et al., 2000), and intergroup aggression based on the voodoo doll task (DeWall et al., 2013), a measure of symbolic aggression where participants are asked to stab pins into a doll representing an outgroup member. Although, due to ethical considerations, assessing aggression and hostility in experimental settings may be challenging, some measures do exist that are routinely used in psychological research, including the hot sauce paradigm (in which participants allocate desired amounts of hot sauce that another individual, known to dislike spicy food, would have to consume; Lieberman et al., 1999) or the Taylor aggression paradigm (in which individuals have the opportunity to aggress towards others by administering unpleasant noise blasts; Chester & Lasko, 2019). It would be desirable to replicate the present results using other measures of hostility and aggression in order to increase the generalizability of our findings.

The present findings suggest that the intergroup context may influence the effects of vicarious intergroup exclusion. Here, we observed some differences in the effects of vicarious intergroup exclusion when examined in the context of minimal groups and existing groups. Further variability among the results was present when the excluding outgroup was

perceived more or less favourable by participants. In order to draw informed conclusions about real-world intergroup relations, we recommend that future research examines the exact role of the intergroup context, such as the role of pre-existing beliefs about and attitudes toward the outgroup. Furthermore, while the results were mainly consistent across the studies presented here, it is also possible that some cross-cultural variability may exist. We urge future research to clarify this, replicating the present studies in novel cultural contexts.

We tested two types of interventions, aiming to fortify emotion regulation and thus alleviate the negative consequences of vicarious intergroup exclusion. The brain stimulation and mindfulness meditation interventions did not work in the intended way. However, rather than providing evidence against the prediction that increased emotion regulation may lead to a more adaptive downregulation of the negative affect caused by exclusion, thus reducing subsequent mood impairment, intergroup hostility, and aggression, the interventions did not seem to increase emotion regulation as we expected. We thus recommend that future research continues to test our prediction with novel interventions based on our theorizing. The descriptions of the unsuccessful interventions presented here, as well as our rationale for choosing them, may help social scientists head in new directions, hopefully with more successful results.

10.8. Conclusions

The prevention of intergroup conflict and violence is an especially timely matter. The social exclusion of groups escalates such conflict and violence (Choi & Piazza, 2016; Crenshaw, 1981; Regan & Norton, 2005). Across five experiments, we investigated the responses to the exclusion of the ingroup that is merely observed rather than directly experienced. We observed that vicarious intergroup exclusion leads to a personal experience of exclusion and impaired mood, and, under some circumstances, to increased intergroup hostility and aggression, as well as threatened fundamental psychological needs. We clarified

some of the conditions that further influence these effects. The findings suggest that the relationship between vicarious intergroup exclusion and intergroup hostility and aggression happens indirectly, via mood impairment. The findings presented here point towards ways of reducing and preventing intergroup conflict related to vicarious intergroup exclusion. We tested two types of interventions aiming to fortify emotion regulation, and thus to reduce the negative consequences of vicarious intergroup exclusion. Although these were unsuccessful in achieving this aim, future research may rely on the experiments presented here in attempt to identify and develop novel interventions that may serve the same purpose. The present research holds the potential to inform social scientists, policy makers, and governments, among others, in fostering intergroup peace.

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Appendices**Appendix A**

Table A1

Gender Differences in Aggression

Study	Male: <i>M (SD)</i>	Female: <i>M (SD)</i>	<i>F</i>	η^2
1b	0.28 (0.43)	0.30 (0.39)	0.21	.001
2	0.18 (0.27)	0.33 (0.39)	1.94	.03
3	0.54 (0.62)	0.49 (0.60)	1.56	.01
4	0.65 (0.67)	0.54 (0.61)	5.88	.01

Note. Only participants reporting their gender as male or female were included in these analyses.

Appendix B

Items of the original and adapted need satisfaction scale (Jamieson et al., 2010)

- *1. I felt “disconnected”. (R)
- *2. I felt rejected. (R)
- *3. I felt like an outsider. (R)
- *4. I felt I belonged to the group.
- 5. I felt the other players interacted with me a lot.
- *6. I felt good about myself.
- *7. My self-esteem was high.
- *8. I felt liked.
- *9. I felt insecure. (R)
- *10. I felt satisfied.
- *11. I felt invisible. (R)
- *12. I felt meaningless. (R)
- *13. I felt nonexistent. (R)
- *14. I felt important.
- *15. I felt useful.
- *16. I felt powerful.
- 17. I felt I had control over the course of the game.
- 18. I felt I had the ability to significantly alter events.
- 19. I felt I was unable to influence the action of others. (R)
- 20. I felt the other players decided everything. (R)

Note. (R) = reverse scored item. * = the items included in the intergroup context.

Appendix C1

The mindfulness meditation intervention used in Study 4

Bell / Gong

Sit down comfortably. Take three deep breaths in and out, breathing in through your nose, and exhaling through your mouth. Listen to your breath (breath pause). At the next exhalation, close your eyes, continue to breathe normally, noticing how the breath moves your body. If during this exercise you notice that you are not listening to the recording and your mind is wandering, calmly turn your attention back to the recording and continue with the exercise.

In this exercise, we'll focus on our body awareness. Start by directing all your attention to your feet. Feel their weight, temperature, feel their contact with the floor. Investigate with curiosity what physical sensations appear in your feet right now.

Now move your attention slowly to your calves, shins and knees. Investigating any sensations that arise. Move your attention freely, noticing what appears, allowing it to last. Move your attention to your thighs. Be aware of your whole legs.

Now move your attention to the buttocks and pelvis. Feel the buttocks in contact with the floor or chair. Note the sensations that appear at the base of the spine. Slowly move your attention to the abdomen, watching the sensations that appear here, outside, on the skin and in the internal organs.

Now, direct your attention to your back, to your spine, which allows you to maintain a vertical posture. Investigate with curiosity what feelings appear in your back right now.

Now, move your attention to your shoulders and arms. Observe what feelings appear in the part of the body that often reacts most to stress. Shift attention upwards examining the chest inside and outside. Watch your chest move with your breath. Feel your heartbeat.

Now move your attention towards your head. Observe the sensations that appear in the throat, back of the neck, and its front. Notice what you feel in the jaw area, which often reacts to the emotions we feel. Note the airflow in your throat and nose as you breathe in and out.

Keep moving your attention slowly to your cheeks, ears and eyes. Feel the weight of the eyelids, the weight of the eyeballs in the eye sockets.

Keep moving your attention to your forehead and up to the top of your head, and the back of your head. All the while examining all physical sensations on the skin. There may be pulsing, tingling, intense or mild. Whatever it is, let it stay that way.

Embrace the whole body and experience it as it is now.

Then, for a moment, let your mind do what it wants, letting him think about what it wants or not think about anything (half a minute). Now turn your attention to the body again, noticing its weight, contact with the chair and floor. Slowly notice the sounds around you and the physical sensations of touch, smell and maybe taste. Slowly open your eyes if you need to drag or change positions and stay for the moment. Finish the exercise when you hear the bell.

Bell / Gong

Appendix C2

The mindful gratitude meditation intervention used in Study 4

Bell / Gong

Sit down comfortably. Take three deep breaths in and out, breathing in through your nose, and exhaling through your mouth. Listen to your breath (breath pause). At the next exhalation, close your eyes, continue to breathe normally, noticing how the breath moves your body. If during this exercise you notice that you are not listening to the recording and your mind is wandering, calmly turn your attention back to the recording and continue with the exercise.

In this exercise, we'll focus on our body awareness. Start by directing all your attention to your feet. Feel their weight, temperature, feel their contact with the floor. Investigate with curiosity what physical sensations appear in your feet right now. Such relatively small feet can support the entire weight of your body. Feel gratitude for their work. Thank them that during the whole day they move your body from place to place without effort and often without your awareness of their work.

Now move your attention slowly to your calves, shins and knees. Investigating any sensations that arise. Move your attention freely, noticing what appears, allowing it to last. Move your attention to your thighs. Be aware of your whole legs. Send them a feeling of gratitude for their tireless work because thanks to them you can get up and sit down, move.

Now move your attention to the buttocks and pelvis. Feel the buttocks in contact with the floor or chair. Note the sensations that appear at the base of the spine. Slowly move your attention to the abdomen, watching the sensations that appear here, outside, on the skin and in the internal organs. Thanks to their work, when they digest all the food you eat, you get the energy to live. Send them a feeling of gratitude and thank them for their effort.

Now, direct your attention to your back, to your spine, which allows you to maintain a vertical posture. Investigate with curiosity what feelings appear in your back right now. It is thanks to the work of your spine that you can walk on two legs and when you feel like it, lie down comfortably. Send a feeling of gratitude to your spine for offering you all these possibilities.

Now, move your attention to your shoulders and arms. Observe what feelings appear in the part of the body that often reacts most to stress. Shift attention upwards examining the chest inside and outside. Watch your chest move with your breath. Feel your heartbeat. Feel gratitude that breathing occurs automatically, usually without your attention connecting you with the world around you, it does not depend on you and is the basis of your life.

Now move your attention towards your head. Observe the sensations that appear in the throat, back of the neck, and its front. Notice what you feel in the jaw area, which often reacts to the emotions we feel. Note the airflow in your throat and nose as you breathe in and out.

Keep moving your attention slowly to your cheeks, ears and eyes. Feel the weight of the eyelids, the weight of the eyeballs in the eye sockets. Feel gratitude that your eyes allow you to see the world that surrounds you and the people you love. Thanks to your ears you can hear the sounds of music or the voices of your loved ones.

Keep moving your attention to your forehead and up to the top of your head, and the back of your head. All the while examining all physical sensations on the skin. There may be pulsing, tingling, intense or mild. Whatever it is, let it stay that way.

Embrace the whole body and experience it as it is now.

Feel gratitude for this body, its complicated and wonderfully functional mechanism, which we understand only to a limited extent and thanks to which we live.

Then, for a moment, let your mind do what it wants, letting him think about what it wants or not think about anything (half a minute). Now turn your attention to the body again, noticing its weight, contact with the chair and floor. Slowly notice the sounds around you and the physical sensations of touch, smell and maybe taste. Slowly open your eyes if you need to drag or change positions and stay for the moment. Finish the exercise when you hear the bell.

Bell / Gong

Appendix C3

The control anatomical text used in Study 4

Our internal organs can be grouped into several systems: e.g., blood, nervous, digestive, respiratory, excretory, reproductive, endocrine, and locomotor. They are closely related, and many organs belong to several systems simultaneously (e.g., the kidneys cleanse the blood and produce hormones). All internal organs are well protected. Skeletal elements, muscles (e.g., abdominal cavity), fluids (e.g., fluid surrounding the brain), as well as fat and skin protect them against injuries. The latter also protects us from chilling or overheating, and from water loss.

In the human body, as in any well-organized enterprise, order is supervised by the ‘boss’ – the brain. It controls the functioning of the whole body and it is responsible for thoughts, feelings, and memory. The brain consists of two hemispheres. The left one – dominating among scientists and exact minds – is responsible for logical, analytical thinking, creating sentences that we utter, and ‘seeing’ the details of objects. The right hemisphere – dominating among artists and humanists – is responsible for imagination, intuition, sense of rhythm, colour perception, and ‘seeing’ the outline of objects.

The central part of the chest is occupied by the heart. Together with blood vessels, it ensures the transportation of substances in the body. The heart is the size of a clenched fist, shrinking 100,000 times a day, pumping around 10,000 litres of blood.

The heart is surrounded on both sides by the lungs, which are our ‘air conditioners’. The lungs are made of five lobes: The left lung consists of two lobes and the right lung consists of three. The lungs have a vesicular structure. In an adult, they can hold about 5 litres of air. For women, this value is 3.2 litres on average, and for men 4 litres. However, the lung capacity of athletes can be up to 7 litres! Humans breathe on average 16 to 24 times a minute,

exchanging only 0.35 to 0.5 litres of air each time. This means that the remaining few litres of gas in the lungs remain in them for more than one breath.

The abdominal cavity is filled mainly with the organs of the digestive system: Stomach, duodenum, liver, pancreas, and intestines. The stomach is a flexible sack for all the food we eat. In the stomach, food is treated with gastric juice – a mixture of hydrochloric acid and enzymes. Hydrochloric acid kills bacteria. The walls of the stomach are covered with special mucus, which protects them against the effects of their corrosive secretions.

Digested food goes to the duodenum, i.e., the first segment of the small intestine. Further digestion of proteins, sugars, and fats takes place here due to the pancreas secreting digestive enzymes and the liver secreting bile. The bile produced by the liver is stored in the gallbladder and is released into the duodenum during a meal.

The liver, lying just below the diaphragm on the right side of the abdominal cavity, in addition to bile production, is also responsible for the production and secretion of almost all plasma proteins into the blood, stores glycogen, fats, vitamins, and iron. It also ensures that blood does not provide poisonous components to the body. The liver is essential to life. Its extensive damage caused, e.g., by toxins (e.g., alcohol), drugs, viruses, or parasites, leads to death.

The pancreas is located on the posterior wall of the abdominal cavity at the height of the first lumbar vertebra. During the day, it releases about 2.5 litres of liquid containing a large number of enzymes that digest proteins, sugars, and fats into the duodenum. The pancreas also secretes hormones that regulate blood sugar (insulin and glucagon).

The distal parts of the digestive tract visible in the abdomen – the small intestine and the large intestine – are responsible for the absorption of substances from the digestive system. In the small intestine, the products resulting from digestion are absorbed, and in the large intestine, water and electrolytes are absorbed, and faeces are also produced. The

intestines can be compared to a terry towel because they have a very large absorbent surface due to the presence of villi.

Other internal organs unrelated to the digestive system and visible in the abdominal cavity are kidneys and spleens. The spleen watches over the condition of your red blood cells. It is also called the ‘cemetery’ of the body, i.e., the place of removal of defective and dead erythrocytes. During the fetal life, new erythrocytes are produced in the spleen. It is also the largest ‘bodyguard’, the largest organ of the lymphatic system, and is responsible for the production of immunoglobulins (a specific type of protein responsible for the body's immunity). There may be more than one spleen in the human body.

Kidneys are a ‘sewage treatment plant’. They filter blood and excrete excess water, mineral salts, and other substances that are unnecessary and/or harmful to health. They are also responsible for maintaining a constant volume, osmotic pressure, and electrolyte composition of body fluids (aqueous solutions of substances found outside living cells, which are one of the main components of the organism in terms of mass and volume). Although the kidneys are an even organ, only one kidney is sufficient for the body to function properly. During the day, about 170 litres of fluid flow through the kidneys – primary urine. After filtering into the bladder, about 1.5 litres of urine pass through the ureters, which is excreted through the urethra.

The study of the internal body structure is one of the oldest biology disciplines. Anatomy has been developing since V century BC. The most prominent representative of this science in ancient times was Hippocrates (V-IV centuries BC). The development of modern anatomy was initiated by the Flemish scholar Andreas Vesalius (1514–1564). Anatomy was a descriptive science for a very long time, and an autopsy was used to study the human body. This changed on January 23, 1896, when the German scientist Wilhelm K. Roentgen presented his brilliant discovery to the world – the X-ray. The discovery of Roentgen

revolutionized medicine. Thanks to it, it was possible to view human bones and some organs without using a scalpel. In the same year the Polish surgeon Alfred Obaliński recognized an elbow dislocation based on an X-ray.

The next big step in the history of anatomy was organ transplantation. The first transplant was made by Boston physicians Joseph Murray and John Merrill in 1954. The transplanted organ was a kidney.

Today, modern techniques allow almost every internal organ to be viewed without surgical intervention. In addition to X-ray images, among others, ultrasound is used, which is based on high-frequency waves. These enter our body and bounce off internal organs. The reflections are processed by the computer and displayed on the monitor. Another method is magnetic resonance imaging, which allows one to obtain a three-dimensional image of internal organs. X-rays were replaced here with a very strong electromagnetic field.

Computer tomography uses X-rays but allows one to obtain a three-dimensional image of cross-sections of our body. The patient is placed inside a scanner tunnel, while the X-ray machine rotates around him and takes not one, but hundreds of pictures during the examination. The computer processes the obtained images into a three-dimensional image of the body cross-section.

Direct view of the internal organs is possible thanks to fiberoptics. For this, a flexible tube terminated with an optical device that sends the image to the computer is used. It is introduced into the body through the mouth, the patient's anus, or a small surgical incision.