

**Minority versus Majority:  
A New Paradigm of Intergroup Conflict**

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Submitted in Partial Fulfilment of the Requirements for  
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*I trust in nature for the stable laws of beauty and utility.*

Robert Browning, 1812-1889

**Statutory Declaration**

(On Authorship of a Dissertation)

I, *Dora Šimunović*, hereby declare that I have written this PhD thesis independently, unless stated otherwise. I have used only the sources, data and support clearly mentioned and described in the text. All of the intellectual property of other authors used in the dissertation text is credited to them. This PhD thesis has not been submitted for conferral of degree elsewhere.

I confirm that no rights of third parties will be infringed by the publication of this thesis.

Bremen, September 20, 2017

Signed \_\_\_\_\_

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not always see eye to eye, but he faced me with some of the toughest and most important questions that one can ever encounter in academia: Can I persevere when things go badly? Can I withstand criticism and embrace it? Can I deliver research which is worthwhile? In fact, I am still learning from Yamagishi-sensei, understanding things we had discussed in my undergraduate times only now, years later, as they resurface to unnerve, inspire, and guide me. I hope to pass on some of that to new generations of eager young minds, in my own way. In the meanwhile, I thank you for the hard lessons, even when they hurt.

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Finally, writing the dissertation, I realized how little I know, and how much less even than when I had started. This, I suppose, is what they call re-search.

## **Dissertation Summary**

Living in an ethnically and culturally heterogeneous social setting has been fraught with problems, and therefore a prime subject for a variety of social science disciplines. Indeed, intergroup relations are a thriving research topic in psychology, anthropology, behavioural economics, sociology, et cetera. This dissertation will be adding to the discussion by addressing the dynamics of conflict between minorities and majorities. More precisely, it will tackle the question of majorities discriminating against minorities who live in their society by situating the question in the Structural Goal/Expectation Theory (sGET) approach. Rather than relying on identity or attitude biases, sGET pushes forward an evolutionarily inspired view of human intergroup behaviour in which, crucially, the incentive structures inherent to the situation and the interpersonal interaction between the actors can be directly linked to behaviour. Thus, it is argued in the thesis that group-level interdependence, what is to say the dependence of all group members on common resources they jointly manage, is a crucial component of minority discrimination. The dilemma embedded in common resource management, the freerider problem, provides the structures which can lead to minority discrimination becoming a default behavioural strategy.

The dissertation is divided into five chapters, and a collection of supplementary materials. The first and final chapter are written solely for the dissertation, while the middle three chapters are manuscripts meant for individual publication as articles. At the time of submission, only Article 1 (Chapter 2) has been submitted for publication in its earlier and shorter form. It is currently under revision for the International Association for Cross-Cultural Psychology proceedings booklet from the Nagoya conference in 2016, where the content has been initially presented.

Because of the required format for this dissertation, the Article-Chapters will not follow one another textually. In addition, some of the content will overlap, since these chapters were written as standalone material. The introductory and concluding chapters are meant to provide a framework for them.

Thus, Chapter 1 provides a general theoretical background to the central questions of the thesis, as they will be addressed in the empirical chapters. It starts with a detailed view of the various problems of coexistence encountered by minority and majority groups, as well as the self- and structure-based explanations for them. It goes on to argue for the Structural Goal/Expectation theory's expansion and integration with evolutionary psychology, discussing its history, the strengths and short-comings of its theoretical framework, and the appropriate methods for researching it. This is then applied to the narrower question of minority and majority interaction in the face of the common resource management dilemma.

Chapter 2, Article 1, will focus solely on theory building, extending it beyond the questions asked in the thesis itself. At the heart of this chapter is an argument for the integration of the more popular, self-based, and more complex, structure-based perspectives into an extended structural Goal/Expectation theory. After a discussion of the evolutionary function of human groups, and its impact on the development of a particularly human social psyche, a framework of investigation is suggested. This framework is based on four different types of interdependence which can occur between groups: interpersonal, group-level, intergroup, and socio-cultural interdependence. While three of these have in some fashion existed in literature previously, the concept of group-level interdependence and its impact on intergroup behaviour is a new theoretical proposition, and the topic of the empirical portions of the dissertation.

Chapter 3, Article 2, addresses the central question of the thesis – the interaction of minority and majority members given group-level interdependence. While often confounded in literature with independent groups of equal size, I argue that minorities and majorities are distinct groups of unequal size which are nevertheless interdependent on the group level. This means that they rely on each other for the generation, maintenance and redistribution of group resources, as well as methods of solving the dilemma engendered within. Two experimental studies conducted in the social sciences lab on a student and general population sample are presented. They show that if the knowledge of common resource management dilemma is engaged, majority groups will show a priori negative bias, meaning a deliberate detraction from minority members' resources, while the minority will suspend intergroup bias. These findings cannot be explained with Social Identity Theory alone, but are predicted by sGET.

Chapter 4, Article 3, repeats the experiments from Article 2 on groups of equal size. This exploratory study finds that group-level interdependence might in and of itself be enough to engage a priori negative bias or outgroup hate. The result is discussed with reference to the theoretical background presented in Chapter 2.

Chapter 5, the discussion, begins with the summary of the empirical evidence presented in chapters 3 and 4. The limitations and future directions are discussed, as well as methods of applying the present findings to peace-making efforts and policy implementation.

Supplementary Materials consists of an exhaustive description of the studies described in Chapters 3 and 4, as well as the materials used in them. While the software used in the various studies is only available upon communication with the author, screen caps representing what the participants had seen during the experiment are included. Finally,

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there are some notes on the design, its development, and the decision-making process, meant to accompany the thesis as a whole.



## **Chapter 1.**

**General Introduction: Living in Diversity is Living in Adversity?**

## Introduction

With increasing geographical mobility, globalization of business processes, and stress on multiculturalism in the media and education, there can be no denying that the face of local, previously homogeneous communities is undergoing tremendous change. On the one hand, this is something to be celebrated. On the other, it is a frightening step into an unknown shared future, both for the newly formed minority communities, and the host country's majority. It is therefore perhaps no wonder that a simple Google search reveals an ambiguous attitude towards increasing heterogeneity, as this snapshot from Debate.org shows (Figure 1). At the time of retrieval in August 2017, a meagre majority of the respondents, fifty-seven percent, indicated it would be good to live in a multicultural society. The rest answered a resounding no, giving various reasons, from ethnic tensions, trouble establishing the rule of law, to the loss of one's own cultural identity.

It is not only the general public or their political representatives that are engaging with this question. The effects of multiculturalism are debated in social sciences as well (Verkyuten, 2005; Verkuyten & Martinovic, 2006). Defined by Fowers and Richardson (1996) as a "socio-intellectual movement that promotes the value of diversity as a core principle and insists that all cultural groups be treated with respect and as equals" (p.609), multiculturalism is almost inseparably entangled in ideology (Vermeulen & Slijper, 2003). Thus, the presence of different minority groups in a society can be constructed either as valuable intellectual and cultural capital to be shared and exploited, or as a threat to the majority's dominance simultaneously hampering upward social mobility of the minority (Pratto & Lemieux, 2001). Surely, nothing is more worthy of attention than an issue which splits us so pointedly down the middle.

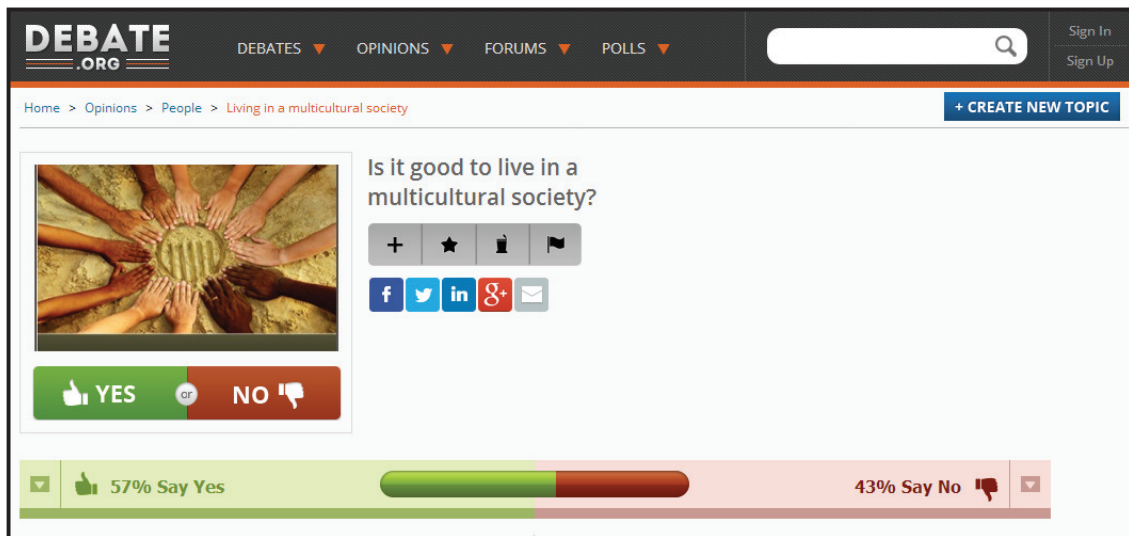


Figure 1. Snapshot from Debate.org in which users were asked their opinions of living in a multicultural society. Retrieved August 3rd, 2017.

In Louvain, in 1996, former German chancellor Helmut Kohl stated that the policy of European integration is really a question of war and peace in the 21st century. His audience at the time may have interpreted this comment as an endorsement of EU expansion, and as a warning to the UK parties already buzzing against it (Helm, 1996). However, today, we may read it differently - as an insightful caveat for an audience twenty years into the future, struggling with within-state ethnic, religious, cultural and political faultlines. In the same speech, Kohl went on to warn of the dangers of nationalism, calling it war itself. We can suppose that the recent and bloody breakup of Yugoslavia was fresh in his mind at the time, and while a politician has license, even a duty, to dramatize, his statement was hardly an exaggeration. Today, Islamic fundamentalists' attacks on European cities are met with xenophobia and a noticeable rise of the political alt-right. This, in turn, is countered by left-wing activism, an extreme version of which led to the Welcome to Hell march turning violent during the G20 meeting in Hamburg just a few months ago (Polke-Majewski, 2017). Negotiating diversity between European states but

also the many ethnic groups living in them, their political perspectives, religious and cultural traditions - was and is a question sometimes answered with organized violence.

Why do we have such troubles living together? What is it about group membership that creates boundaries, tensions, and competition? Trying to explain hostilities between minority and majority groups by relying on any single theoretical perspective, or branch of social science, is sheer hubris. Modern investigation on intergroup conflict is, therefore, necessarily interdisciplinary.

In this work, I will describe my doctoral project on the topic of minority and majority conflict. The approach I chose to take is a recognizably multi-faceted one, integrating theories and findings from evolutionary, social, and cognitive psychology, as well as anthropology, archaeology, population genetics, and game theory. Minorities and majorities are here defined as groups of unequal size which nevertheless belong to a functionally interdependent superordinate group. I argue this definition better mimics the reality of ethnic, cultural, religious or political minorities living in a larger society, than do the more traditional independent ingroup and outgroup. Crucially, it acknowledges the differences in incentive structures for behaviour in independent as opposed to interdependent situations. While previous research has sometimes equated the two, I propose there is sufficient reason to suspect the psychological mechanisms for dealing with embedded minorities or looming majorities, as opposed to an autonomous outgroup, are separate and specific.

The central argument of the thesis is that minorities and majorities in modern societies often share the management of a common resource (Chapter 3). Put in a different way, they are interdependent on the group-level. That means they are jointly tasked with the generation, maintenance and redistribution of public goods which can range from fresh

water, clean air, or a tidy neighbourhood, to social welfare, public health insurance, or national security. Each of these engrains a social dilemma which we can describe in game theoretical terms, and which has been a staple conundrum all human societies had to solve (Dunbar, 1999; Hauert, De Monte, Hofbauer, & Sigmund, 2002; Olson, 1965; Parks, Joireman, & Van Lange, 2013). In this dissertation, I show that engaging the awareness of a common resource management dilemma between a minority and majority causes asymmetrical negative bias even in minimal situations. Put another way, when common resources have to be actively managed in a diverse group, the majority will deliberately detract from minority outcomes. At the same time, minority will reduce bias, exhibiting little or no significant derogation. The negative bias is here interpreted as deliberate difference maximization, or outgroup hate. Significantly, it occurs even though the individual decision-makers had no vested interest to commit intergroup bias. The effect is explained by the majority's expectation that the minority will cheat on the common resource management dilemma.

While the issue of minorities and majorities is the central empirical question of the work, it is not its only contribution. In particular, the thesis seeks to showcase Structural Goal/Expectation theory (sGET; Pruitt & Kimmel, 1977; Yamagishi, 1986) as I have applied it to intergroup conflict. This theoretical contribution will be an important topic of discussion, since it challenges some more well-known and popular approaches to the issue, notably Social Identity Theory (Chapter 2). My hope is that the framework I have described here can be expanded, refined, and eventually integrated with other approaches into a practical theory of intergroup behaviour.

With this in mind, I applied sGET to the question of common resource management more generally, asking what the consciousness of that sort of exchange within or between

groups does for intergroup bias (Chapter 4). I found that even in groups of equal size, knowledge of common resource management induces difference maximization. This holds true regardless of whether the groups share custody of the resource, or manage individual resources. In other words, people exhibited outgroup hate the moment they were made to think in terms of group-level interdependence, unless they were in the minority. This finding is discussed from an evolutionary perspective,

In this introductory chapter of the thesis, I will give a brief theoretical overview of the issues inherent in living in diverse societies. Next, I will go into the theories of intergroup conflict, particularly when applied to minorities and majorities. Mainly, I will focus on Social Identity Theory, its many cognates, and Structural Goal/Expectation theory. I will go on to argue for the value of applying evolutionary theory to the issue, and briefly describe the theoretical approach I will be using in the rest of the text, its development and application. Finally, I will provide some notes on the methods used in the studies presented, how they were chosen and why they are appropriate for the research questions.

### **The Trouble with Diversity**

Ethnic and cultural diversity is hardly a new phenomenon, but one which is currently highlighted, most recently by waves of mass migration into Southern and Western Europe (Castles, Haas & Miller, 2013; Katseli, Lucas, & Xenogiani, 2006; Sievers, Fassman, & Bommers, 2014). Germany, where I am writing, is currently among the leaders in attracting migrants. It has experienced a fourteen-fold growth of populations with migration backgrounds between 1960 and 2003 (BAMF, 2006), and there is no sign of this stopping (Autorengruppe Bildungsberichterstattung, 2016). The same trend is evident in the rest of Europe (Beck-Gernsheim, 2007; Carballo, Divino, & Zeric, 1998), the US (Lee &

Bean, 2004; Perez & Hirschman, 2009; US Census Bureau, 2009), in Australia and Southeast Asian Nations (Hugo, Wall, & Young, 2015), and elsewhere.

As Kohl warned, increasing diversity has been marked by hostilities between groups (Brown & Zagefka, 2011; Farrell, 1993; Fuchs, 1995; Kessler et al., 2010; Kuepper, Wolf, & Zick, 2010; Nelan, 1993; Pereira, Vala, & Costa-Lopes, 2010; Takaki, 1989; Zagefka et al. 2014), engendering policy challenges we have not even begun to tackle (Vertovec, 2007). In addition, media exposure has made these issues more salient (Castles, Haas, & Miller, 2013) compounding the situation, and driving the entire political spectrum to the right (Davis, 2012). Merely reading about increasing diversity has led to greater expression of fear and anger directed at minority groups (Outten, Schmitt, Miller, & Garcia, 2012), and increased implicit and explicit outgroup negative bias (Craig & Richeson, 2014a). Givens and Luedtke (2003) demonstrated a link between media coverage and the restrictiveness of the government's immigration policies irrespective of political partisanship. Craig and Richeson (2014a, 2014b) went a step further. They experimentally manipulated the consciousness of increasing diversity by giving participants press releases projecting that European Americans will be outnumbered by Hispanic Americans in the US by 2042 (the so-called minority-majority racial<sup>1</sup> shift). Their results show exposure to such information can drive the ethnic majority to greater support for political conservatism and anti-immigrant policies, as well as more negative attitudes towards all ethnic minorities. They further showed the shift was explained by perceived threat to their own group status, in accordance to Integrated Threat Theory (Stephan & Stephan, 2000). Building on these studies, Major, Blodorn and Blascovich (2016) took advantage of the 2016 US presidential elections to further prove the point. After administering Craig and Richeson's

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<sup>1</sup>In this text, I refrain from using "race" as a stand-in for ethnicity since there is only one human race alive at the moment, the *Homo sapiens*.

manipulation, Major and colleagues had the participants evaluate the presidential candidates. As predicted, the manipulation was enough to cause a more positive attitude towards Donald Trump, who ran on a highly anti-immigrant platform, and a more negative one towards the vocal socialist, Senator Bernie Sanders. The authors conclude increasing diversity and the fear attached to it, account in part for Trump's eventual electoral success.

Thus we can see that diversity almost invariably has a negative impact on the majority's attitudes towards minorities, and therefore on their relations. Ethnic minorities, in particular, often occupy the lowest social niche and face the highest levels of discrimination and ostracism (Hagendoorn, 1995). It is little surprise, then, that the minority members have been found to dissociate from the society they are sharing with the majority (Abrams, 1994; Brewer & Weber, 1994; Branscombe, Schmitt, & Harvey, 1999; Steele, 1997), and endorse multiculturalism at the expense of assimilation (Arends-Toth & Van de Vijver, 2003; Lambert & Taylor, 1990; Verkuyten, 2005). Andre and Dronkers (2017) use the European Social Survey to measure perceived discrimination of over 29,000 adults with migrations backgrounds living in 27 EU countries. Despite the fact their sample, by merit of being drawn from the ESS database, consists of relatively well-established migrants, who were able and willing to fill in a questionnaire in the host country's language, minority members indicated they felt their social group was discriminated more frequently and severely than the majority group. The perceived ingroup discrimination was pronounced the more culturally distant the minority felt they were from the majority, in terms of language, religion, or ethnic characteristics.

Perceived discrimination can lead to minority communities isolating themselves against the majority, but also to the opposite - outgroup favouritism, especially when the minorities perceive their group's status is relatively lower than that of the majority (Blanz,



Mummendey & Otten, 1995a, 1995b; Ellemers, Barreto, & Spears, 1995). Thus, not only can the minority members reject the host society, but they can also reject their own community and culture. Unsurprisingly, this makes them fall victim to increased anxiety, depression, apathy, and psychosomatic symptoms, as well as overall lower reported wellbeing, more often than the majority (Dion, Dion, & Pak, 1992; Jasinskaja-Lahti, Liebking, Jaakkola, & Reuter, 2006; Jasinskaja-Lahti, Liebkind, & Pehoniemi, 2006; Moghaddam, Ditto, & Taylor, 1990; Pak, Dion, & Dion, 1991; Sanchez & Fernandez, 1993; Sandhu & Asrabadi, 1994;).

However, there are indications that the trouble with diversity has an even more general adverse effect, influencing society as a whole. Research into macroeconomics and societal wellbeing have found diversity, i.e. the presence of outgroups within the society, lowers social cohesion (Benabou, 1996; Durlauf, 1996; Putnam, 1995), decreases contributions to public goods such as education, public health, or city infrastructure (Alesina, Baqir, & Easterly, 1999; Alesina & LaFerrara, 2000), and promotes overuse of existing resources (Khwaja, 2002; Motalvo & Reynal-Querol, 2005). Investigating reasons for Sub-Saharan Africa's troubled economic development, Easterly and Levine (1997) found a strong negative correlation between ethnic diversity and indicators of public goods (percentage of paved roads, number of private telephones, years of schooling and efficiency of the electricity network). Alesina, Baqir and Easterly (1999) performed a more direct test of the hypothesis that diversity negatively impacts the group's engagement with public goods. They investigated spending on productive public goods (specifically, schools, roads, sewers, and trash management) in US cities, metropolitan areas and urban communities, and found that it is inversely related to ethnic fragmentation. The correlation remained even after controlling for other socioeconomic and demographic determinants.

More recently, Miguel (2004) compared contributions to local schools in bordering Kenya and Tanzania. The regions were chosen for their similar ethnic makeup, and levels of diversity. Overall, Tanzania had a higher degree of public good contribution. Significantly, in Tanzania ethnic diversity was not correlated to donations to local school funds, while in Kenya the relationship was significant and negative. Miguel puts the difference in results down to Tanzania's aggressive policy of integration, which was based on the adoption of a superordinate national identity. This finding was later replicated in the similarly integrated Sierra Leone (Glennester, Miguel, & Rothernberg, 2013). Meanwhile, in Kenya, with no such integration policy in place, ethnic fragmentation led to lower giving to primary school funds, overall worse school facilities, and poorer water well maintenance. The finding has been interpreted as a result of ineffective sanctioning systems between ethnically diverse communities (Miguel & Gugerty, 2005). In other words, the mechanisms of solving the frieerider problem fail when they have to cross group borders.

The same is evident using global data as well. Montalvo and Reynal-Querol (2005) demonstrated that religious and ethnic polarization have a significant detrimental impact on economic development, due to fewer, less generous investments into, and increased consumption of, public goods. In addition, they found that diversity in such conditions infrequently contributes to civil war.

It is not only along the lines of nationality and ethnicity that we observe this effect. In business organizations, demographic heterogeneity has been related to conflict in teams and a reduction in productivity (Hambrick, Li, Xin, & Tsui, 2001; Jackson, Joshi, & Erhardt, 2003; Jehn, 1995; Pelled, Eisenhardt, & Xin, 1999; cf. Jehn, Northcraft, & Neale, 1999; Watson, Kumar, & Michaelson, 1993; see Williams & O'Reilly, 1998; Webber & Donahue, 2001 for revision). Joint ventures encounter problems the more their factional

nature is stressed, and the more additional dimensions of diversity are uncovered between them (Li & Hambrick, 2005). In other words, when people are aware they represent their home company in a joint venture, thus creating a subgroup categorization in the team, the less coalitional and more competitive their behaviour is, damaging their ability to cooperate with team members from the other company, and reducing their overall performance. For example, Jehn and Bezrukova (2009) showed that activating the consciousness of the factional nature of a team decreases the team's ability to achieve goals. While they do not put this finding in the context of group resource management, some similarities are evident, particularly how a lack of trust leads to lesser investment in group outcomes, lower satisfaction with the group membership, and an overall inability to perform well on tasks.

Not only does diversity often cripple the society's ability to generate, maintain and redistribute public goods crucial for its functioning, but it can lower support for the generation of any public resource at all. High immigration rates lower support for social welfare (Gilens, 1996, 2000; Soroka, Harrell & Iyengar, 2013; Luttmer, 2001; Mendelberg, 2001; Schram, Soss, Fording & Houser, 2009; Soroka, Banting, & Johnson, 2006; cf. Peffley, Hurwitz, & Sinderman, 1997; Sinderman, Carmines, Layman, & Carter, 1996).

In a recent paper, Brown-Iannuzzi, Dotsch, Cooley, and Payne (2017) demonstrated that, for a predominantly European American sample, support for welfare was lower if the respondents assumed the welfare would primarily benefit African Americans. Testing the relationship more directly, Soroka, Harrell and Iyengar (2013) administered a vignette study to representative samples in Canada, the UK, and the US. Ethnically diverse targets (European, African, East or South-East Asian) were introduced as potential recipients of welfare benefits, whereupon the participants were asked how much money the target should receive per month. The majority targets – i.e. the ethnically European targets, were

preferred over all other, minority targets. This goes to support the hypothesis that people have discriminatory community preferences in which they only care about (and are willing to contribute to) the welfare of ingroup members (Cutler, Elmendorf, & Zeckhauser, 1993). If the line of ingroup/outgroup is drawn at ethnicity rather than nationality, so is the willingness to support a public good, despite the fact it is supposed to be a national resource.

Thus, diversity creates strife between groups living together, introducing discrimination, prejudice and ostracism into the community. Majorities seem to construct it as a threat to their groups' status. In turn, this ostracizes minorities who then have little choice but to tighten their group boundaries and stick to themselves, shunning the larger community and making the rift deeper. Diversity thus further cripples the flow of social and economic capital in the superordinate group, and results in a loss of public goods upon which group members rely. In the long run, it inexorably leads to conflict; in the worst case, civil war. How can we begin to account for these findings?

To answer this question, I will first address the issue from a Social Identity perspective, giving my critique of its propositions and logic in light of evolutionary psychology and game theory. Thereafter, I will introduce the Structural Goal/Expectation approach to the problem and argue for its greater applicability in resolving the issue.

### **Criticism of Social Identity Theory**

Social Identity Theory (SIT; Tajfel, 1978; 1979; Tajfel, Flament, Billig, & Bundy, 1971; Tajfel & Turner, 1979) is probably the most influential theory of human intergroup behaviour, which has resulted in a large number of research papers and spurred the formation of the majority of other intergroup theories (Hogg, 2016). At its core, SIT proposes the basic human motivation to maintain a positive sense of self leads to intergroup

bias (preferential treatment of ingroup members at the expense of the outgroup) once the self is connected to group membership. Tajfel, Turner and colleagues begin with two simple propositions: humans need categories in order to make sense of the world, and humans are motivated to feel good about themselves.

Categorization is certainly a basic and necessary mechanism of human cognition. Categories are established and juxtaposed in order to reduce cognitive cost and speed up decision making – an ability that often has to do with survival. When it comes to social categorization and group membership, a novel concept of social identity was proposed to explain why certain social categories are treated with contempt while others are preferred. Defined as the part of the self-concept derived from group-membership (Turner & Oakes, 1986) and shared between group members (Yamagishi & Mifune, 2008), it is a link to the basic humans motivation to have a positive and consistent sense of self. The social identity is therefore constantly re-evaluated in reference to ingroup and outgroup outcomes. Depending on that evaluation, group members might be motivated to positively distinguish the ingroup (and therefore the ingroup identity) against a relevant outgroup by maximizing the difference between them. This means that humans should be motivated to exhibit favouritism of their own group (ingroup love), and discrimination of all other compatible groups (outgroup hate) across situations. In other words, according to SIT, our sense of self demands that we sacrifice for our ingroup, contribute and cooperate with group members, and adhere to the norms of fairness and reciprocity no matter the circumstances. At the same time, we should withdraw that sort of prosociality from outgroups, ostracising, discriminating against them or otherwise reducing their status and influence.

Over the years, SIT has been extended and refined, inspiring a number of sister-theories such as, Social Categorization Theory (Turner, Hogg, Oakes, & Reicher, 1987),

Subjective Uncertainty Reduction Theory (Hogg & Abrams, 1993), and Optimal Distinctiveness Theory (Brewer, 1991), to name a few. SIT's influence is felt in the Terror Management Theory as applied to intergroup conflict, which proposes that ingroup favouritism is the result of a justification process of the individual's worldview, and therefore self-esteem (Hewstone, Rubin, & Willis, 2002). While Integrated Threat Theory<sup>2</sup> (Stephan & Stephan, 2000), Social Dominance Orientation (Sidanius & Pratto, 1993; 1999), and System Justification Theory (Jost & Banaji, 1994) all add different twists to the story, they are at the core based on the same self-esteem maintenance hypothesis forwarded by SIT.

In this dissertation, I will collectively refer to these theoretical perspectives under the umbrella term of self-based theories of intergroup bias. By this categorization, I mean not to lump them all together in content, assumptions or predictive power – for example, Brewer's Optimal Distinctiveness Theory makes some largely different predictions from the more conservative versions of SIT, or anything from System Justification Theory literature. I merely mean to note that they all rely on the humanist perspective forwarded by Maslow and Roberts in the 1960s, and, as such, invoke the concept of the self as the ultimate platform of decision-making. In a sense, the self is here considered a level of selection. For this, and several other reasons, self-based theories of intergroup conflict suffer from a few fundamental flaws. I will give a critique of SIT proper, and note when its shortcomings spill over into all other self-based theories of intergroup conflict.

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<sup>2</sup> A note on Integrated Threat Theory: While many of the theory's aspects are influenced by Social Identity Theory's reliance on the self, it also takes a lot from Realistic Conflict Theory, thus straddling the two contrasting approaches - self- and structure-based. I choose to place it with self-based theories of intergroup conflict, because self-esteem maintenance through social identity promotion is the theory's proposed ultimate explanation.

As I do this, it is important to keep in mind that Social Identity theory marked a great leap forward in thinking about intergroup conflict since it introduced several key ideas to the field, such as the fact that group categories in and of themselves carry a powerful cue for behaviour, that intergroup conflict is not always the result of rational action, rather that it is the effect of our biased psychological tendencies, and that these tendencies are universal to human cultures across time. Furthermore, Social Identity theory has had great success at predicting human inter- and intragroup attitude formation, as well as how manipulations of self-esteem can moderate individual intergroup behaviour (Hogg, 2016). However, correlations between levels of social identification and behaviour in different group situations have been problematic (Brown et al., 1992; Hinkle & Brown, 1990; Hornsey, 2008). Since the prediction of behaviour is the central point of interest in this work, SIT's strengths will necessarily remain largely undiscussed, and its weak points will be addressed almost exclusively.

Social Identity Theory started with an experiment. In 1971, Tajfel, Flament, Billig and Bundy created the minimal group paradigm, an experimental manipulation which divides participants into meaningless, "minimal" groups<sup>3</sup>. The hope was to disprove Realistic Conflict theory's (Fearon, 1995; Jackson, 1993) premise that intergroup conflict occurs solely as a result of rational self-interest of the players, i.e. when someone stands to gain something. Rather, Tajfel and colleagues argued that categorization was enough. Indeed, the minimal group division alone was sufficient to elicit greater levels of reported

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<sup>3</sup> In practice, the minimal group divisions are often entirely random, meaning the participants are assigned group membership without reference to any measurements. However, the division is commonly presented to the participants as the result of their supposed preferences or cognitive characteristics. Thus, while the groups are truly arbitrary, it is usual to make the participants believe they are based on some supposedly meaningful criteria. Flip-the-coin group memberships have also been successfully used in minimal group experiments, but seem to induce more suspicion from the participants.

identification with the ingroup rather than the outgroup, as well as more positive overall attitudes towards them (Brewer, 1991, 1999; Hewstone, Rubin, & Willis, 2002). Having thus categorized participants and placed them into an intergroup setting, Tajfel and colleagues had them choose from a sliding matrix how much money they wanted to donate to an ingroup, and how much to an outgroup member. The results showed that people indeed chose to allocate more money to ingroup, rather than outgroup members, leading the researchers to formulate their self-based theoretical framework.

However, we have since become aware of several issues with the original experiment. Firstly, the choice matrices did not enable the participants to favour their ingroup (meaning, provide them with the highest possible payoff), without damaging the outgroup. In other words, ingroup love and outgroup hate were fundamentally confounded. This led to a theoretical prediction that simply did not come true – that people will try to spitefully maximize the difference between ingroup and outgroup members, blindly trying to maintain a positive sense of self-esteem. This, perhaps most obvious criticism of SIT, has since been addressed by authors such as Marilyn Brewer, who is very vocal on the separation of ingroup love and outgroup hate within SIT (e.g. Brewer, 1999). She argued that experimental and real-life data shows attitudes and behaviours towards outgroups are characterized by decreased positivity rather than increased negativity. Indeed, subsequent tests showed that people rarely single out outgroup members for deliberate derogation (Halevy, Bornstein, & Sagiv, 2008; Mummendey et al., 1992; Simunovic, Mifune, & Yamagishi, 2013; see Balliet, Wu, & De Dreu, 2014 for meta-analysis).

Secondly, the original experiment was not as minimal as the authors initially claimed. Karp, Jin, Yamagishi, and Shinotsuka (1993) showed that participants in the original minimal group paradigm experiments had a naïve assumption other ingroup



members would reciprocate their generosity by likewise giving them more money than outgroup members. In other words, participants were counting on generalized reciprocity within the ingroup – a return of their favour by other ingroup members by way of a tacit consensus. Once this naïve expectation was explicitly removed (for example, by telling participants they were the only ones making the allocation) the bias was lowered or altogether eliminated (see Yamagishi, 2007 for review). The introduction of interdependence as a relevant concept in intergroup research, originally by Rabbie, Shot and Visser (1989), and later by Yamagishi and colleagues in the Bounded Generalized Reciprocity Approach (Yamagishi, Jin, & Kiyonari, 1999; Kiyonari, Tanida, & Yamagishi, 2000; Yamagishi & Mifune, 2009; Yamagishi, 2007), twisted the paradigm around from the self to the structure of the situation. I will go into more detail in the next segment of this chapter.

When we apply SIT to the problem of minorities and majorities, a third problem emerges. While real-life studies find as much, if not more discrimination committed by the majority (as I have argued in the previous section), minimal experiments in the laboratory show an entirely different result. In the lab, minimal minorities are more likely to discriminate against the majority than the other way around (Bettencourt & Dorr, 1998; Bettencourt, Miller, & Hume, 1999; Brewer, Manzi, & Shaw, 1993; Hewstone, Rubin, & Willis, 2002; Leonardelli, 1998; Otten, Mummendey, & Blanz, 1996). SIT proposes identity as the proximal mechanism driving this type of intergroup bias as well, pointing to the fact people tend to identify more highly with minority rather than majority membership (Abrams, 1994; Brewer & Weber, 1994; Luecken & Simon, 2005). This feeling of relative distinctiveness has been related to the feeling of vulnerability and exposure inherent in being part of a distinctive minority (Ellemer, Doosje, van Knippenberg, & Wilke, 1992;

Sachdev & Bourhis, 1984, 1991; Simon & Brown, 1987), and overall greater ingroup salience (Bettencourt, Charlton, Eubanks, Kernahan, & Fuller, 1999; Mullen, Brown & Smith, 1992). Brewer and colleagues (Brewer, 1999; Leonardelli and Brewer, 2001) argue that the trade-off between being distinct and being included into a cohesive group is relatively better for the minority rather than majority. This leads to greater satisfaction with the social identity and therefore more demonstrations of ingroup loyalty through discrimination. Meanwhile, the majority members feel their group identity is not distinct enough. They do not relate it to the self as much, and are therefore not very motivated to positively distinguish it from the minority.

Yet Integrated Threat Theory or the Social Dominance Orientation approach, likewise self-based perspectives on intergroup conflict, would predict the exact opposite – the majority should discriminate more, since their dominant status in society is put under threat by the minority. Additionally, a loss of group cohesion through diversity means a drop in group performance on cooperative tasks, thus arguably presenting real risk. Thus we would always expect the majority to discriminate more. Why is this not the case in the lab? Where is the micro / macro discrepancy coming from?

All of this brings me to my fourth criticism of SIT, which applies to its sister theories to varying degrees – it is structure insensitive. Social identity, as it stands, cannot distinguish between differentially incentivized situations, while humans can. For example, Rabbie, Schot and Visser (1989) showed that a simple change in incentive structures can lead people to exhibit outgroup love at the expense of ingroup outcomes. They argue this is a clear demonstration that ingroups favouritism is more contingent on rational cost / benefit calculations than on identity concerns. Thus, once outgroup members are the ones who can impact the individual's fitness, their loyalties follow. Again, the issue here is

interdependence. Seeing their outcomes are not entirely under their own control, individuals ask some of the following questions: what reaction will my behaviour elicit? Who is there to react? What are their goals in this situation? (Rusbult & Van Lange, 2003) The outcomes of this deliberation may be skewed by social identification and concerns about the self-concept, but not driven by them alone.

In their seminal meta-analysis on the topic, Balliet, Wu and De Dreu (2014) demonstrate that mere categorization has an effect as predicted by SIT, but that it is not as robust as the effect of interdependence. They used 212 experimental studies on intergroup relations published from 1965 to 2013, all of which used economic games as the underlying methodology. Next, they coded the different game settings in which intergroup bias was tested, based on how interdependent the games were. Interdependence is here defined as the impact other's choices have on own outcomes (Kelley & Thibaut, 1987; Rusbult & Van Lange, 2003). A game such as the Dictator game, in which a single player makes all the choices for both themselves and the partner, is very low on interdependence<sup>4</sup>. In comparison, a Prisoner's Dilemma game is high on interdependence because each player's choices impact both their own and the partner's outcomes symmetrically. A real-life example of this would be hiring employees, as opposed to forging a business deal - in the first, one party controls the outcome totally, while in the other, the outcome depends on mutual choices. Balliet and colleagues found that intergroup bias in games low on interdependence was lower (e.g. Dictator game;  $d = 0.19$ ) than in games high on interdependence (e.g. Prisoner's Dilemma game,  $d = 0.42$ ). Humans are not making decisions in a vacuum of abstracted identities and subconscious concerns about the self-

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<sup>4</sup>A guide to different economic games mentioned in the thesis text or the references is included in the Supplementary materials. For more details on the Dictator, or Prisoner's Dilemma game, check there.

esteem, but in a world of incentives and other actors, which they have to be equipped to navigate. As I will argue in Chapter 2, social identity is a compass on that journey. It cannot be separated from reference to interdependence.

A final criticism of SIT comes from an evolutionary perspective, and applies fully to all other self-based theories of intergroup conflict as well. Why should the sense of self ever become entangled with group membership? In other words, what is the evolutionary benefit of internalizing group membership? I argue in Chapter 2, that the answer lies in costly signalling (Zahavi,1975). An internalization of group membership of the kind proposed by SIT only makes sense if identifying with the group enhanced the individual's fitness, in this case, their ability to survive and thrive within a group context. If we view groups as networks of interdependent individuals who share resources with each other, then each individual within that network has a vested interest to garner as much benefit from the group at as little cost as possible. Of course, if all individuals behaved this way, the group and its life-giving resources would collapse. In other words, group membership can be seen as a social dilemma, and social identity as an evolutionary rule of thumb for solving it.

Those individuals who identify highly with the group are less likely to over-use its resources, more likely to comply with its norms. Thus, they are also more likely to be singled out for more positive, and fewer negative interactions with group members. This confers onto them a clear evolutionary edge. There is also a non-negligible cost of such behaviour. For example, high identifiers may be unable to transition to other comparable groups, or even get along with them. Apart from the opportunity costs, in times of resource depletion or warfare, this inflexibility can be a high cost indeed. Thus, we would not expect all individuals to identify highly, as shown in Luthanen and Crocker's (1992) work on the development of a collective self-esteem scale, or in numerous experimental studies.

Leonardelli and Brewer (2001), for example, state that “identification is a necessary, but not sufficient explanation for discrimination” (p.470; see also, Brown et al., 1992; Hinkle & Brown, 1990), otherwise we would see a perfect correlation between levels of identity and behaviour in intergroup situations. Instead, we see variance in both identity levels and behaviour depending on the situation, precisely what we would expect if social identity responds to incentive structures and, possibly, moderates behaviour as a proximal mechanism.

In summary, Social Identity theory, while an important and pervasive theory of intergroup conflict, fails to account for some phenomena, while making incorrect predictions when it comes to others. To a degree, this has been addressed over the years. However, some of the theoretical assumptions and issues remain, most importantly, structural insensitivity and the lack of an account for the construction of social identity itself, i.e. the connection between the self and group membership. In the next two sections, I will explain how Structural Goal/Expectation theory (sGET) addresses these core issues. I will first give a brief theoretical and historical account of the development of sGET, following it up with how I mean to apply it to the central research questions of the dissertation, the troubled dynamics between minorities and majorities.

At this point, I should note that the form Structural Goal/Expectation takes in this dissertation is unique. I have attempted to extend the original, tentative theory in scope and theoretical breadth in several ways. First is an elaboration of the role of adaptive behavioural heuristics within the existing propositions of the theory, as applied to intergroup conflict. Secondly, there is the proposed integration of social identity into an evolutionary perspective on intergroup conflict, as guided by the structure and perception of the situation. Perhaps the most important contribution to the development of Structural

Goal/Expectation theory is my attempt to explain what the "structural" part means, and how it can more systematically be applied to predicting human behaviour. All of this comes with a caveat: the framework I will present here is still tentative and only a small part of it was tested in the thesis.

### **Structural Goal/Expectation Theory**

Tracing the history of Structural Goal/Expectation Theory is more arduous and less clear than it was for Social Identity Theory and its cognates. Structural Goal/Expectation Theory (Pruitt & Kimmel, 1977; Yamagishi, 1986a, 1986b) was not originally informed by evolutionary sciences, or aimed at intergroup conflict specifically. The central ideas of sGET are essentially game-theoretical: humans calculate the likelihood of achieving their goals with respect to how they expect other relevant actors will behave. This occurs within a structured social environment which is more or less transparent to the decision-makers themselves. Some of the situations people encounter in everyday life trigger default responses, evolutionary rules-of-thumb for solving the situation in a sustainable way. It is possible to capture these responses even in minimal experiments, by replicating the structure of the situation in question.

The 1977 paper by Pruitt and Kimmel, which marked its beginning as mere Goal/Expectation Theory, featured acritical analysis of 20 years of game theoretical research. Pruitt and Kimmel synthesized the various findings from research utilizing experimental economic games, with an eye towards integrating those findings, methods, and concepts into behavioural and psychological sciences. As stated before, the basic idea of the original Goal/Expectation theory is that behaviour can be predicted at the intersection of the individuals' goals (preferences for different outcomes), and their expectations (predictions about other actors' behaviour). Crucial to this calculation is interdependence,

defined as the degree to which other's behaviour impacts our outcomes (Thibaut & Kelley, 1978). Pruitt and Kimmel give the example of the Prisoner's Dilemma game in which the outcomes of the two players are impacted by both of their decisions. The game affords two choices to each player – defection or cooperation. For each of the combinations (CC, DD, CD, and DC) the payoffs of the players vary. Significantly, a player who cooperates while the other defects is left with the worst possible individual outcome (CD), while the player who defects while the other cooperates, with the best (DC). Mutual cooperation will, therefore, only occur if both players' goals are cooperation, and they expect cooperation from their partner. A player who cooperates despite the fact they think the other will defect, is behaving irrationally and damaging their outcomes. In the long run, such behaviour is unsustainable. Situational preferences for mutually beneficial outcomes therefore must, at least in part, be contingent on predictions about partner's behaviour (Brewer, 1999).

Of course, these calculations are not occurring in a vacuum, but in a (social) environment (Yamagishi, 1986) which carries with it structural characteristics to which humans are (more or less) sensitive. At this point, it is necessary to define what structure of the situation is supposed to be. In the widest possible sense, it is any trait of the environment or the interaction between individuals which can influence their goals, expectations, or outcomes.

Obviously, this definition is almost all-encompassing and thus hardly useful. For this reason, I suggest that the analysis of how people respond to different situations should go through at least two basic stages. The first stage describes the impact actors have, or perceive to have, on each other. We can refer to these as structural characteristics of the interaction. Put another way, this step serves to delimit the type and level of interdependence: how one actor's choices affect another's outcomes, and vice versa. With

this in mind, we can begin to plot the preferences and predictions of the people engaging with each other. I will discuss this topic in more detail in Chapter 2 where I list and define four types of interdependence: interpersonal, group-level, intergroup, and socio-cultural interdependence. I argue that all four reliably occur in intergroup situations, and engender social dilemmas of various types which lead to the formation of behavioural heuristics – adaptive rules of thumb for solving the dilemmas.

The second stage I propose in the analysis of the relation between situation and behaviour describes the impact of environmental factors on the effectiveness, reliability and predictability of any given behaviour that the actors might take. We can refer to these as structural characteristics of the situation. To return to the example of the Prisoner's Dilemma game, we may expect people to behave differently in it if we change certain parameters. For example, if the loss associated with cooperating while the other player defects is increased, more people will defect out of fear and a tendency to avoid risk (Ahn, Ostrom, Schmidt, Schupp & Walker, 2001; Simpson, 2003). If the choices in the Prisoner's dilemma game are made consecutively, rather than simultaneously, people will usually reciprocate cooperation with cooperation, and defection with defection (Hayashi, Ostrom, Walker, & Yamagishi, 1998; Watabe, Terai, Hayashi, & Yamagishi, 1996). If the game is played with the knowledge that others are monitoring the interaction and are ready to sanction norm violators, cooperation levels increase (Tenbrunsel & Messick, 1999).

Likewise if the game is occurring between strangers, rather than within the group, people show differential cooperation levels. They are much more likely to cooperate with ingroup rather than outgroup members or strangers in the Prisoner's Dilemma game (Kiyonari, 2002; Yamagishi et al., 2005), as well as other economic games engendering a dilemma, like the allocation game (Karp, Jin, Yamagishi, & Shinotsuka, 1993; Jin,



Yamagishi, & Kiyonari, 1996), the Dictator game (Yamagishi & Mifune, 2008), and the Trust game (Suzuki, Konno, & Yamagishi, 2007). Thus we can say group categorization itself is another structural characteristic of the situation that skews people's goals and expectations, and thus impacts their behaviour.

In contrast to many other structure-based perspectives, sGET acknowledges the impact of human biases and errors in judgment, since the level of analysis is not the structure itself, but human behaviour within that structure (Yamagishi, 1986). However, this logic can be extended even further – into evolutionary time. Given that certain dilemma-prone social situations have been reliably repeated by human ancestors, evolutionary psychology would suggest they resulted in psychological mechanisms to aid the individual in solving them. This formation needs-must have occurred with respect to, and under the influence of, real structural characteristics of the interaction and the situation.

The addition of an evolutionary perspective to sGET is a logical next step to take. Evolutionary perspectives have been fruitful for social science (Laland & Brown, 2011), and, much as Theodore Dobzhansky said of evolution in biology (1973), uniquely able to provide a reliable matrix for the integration of multiple theoretical perspectives into a coherent whole. When it comes to sGET, evolutionary thought can guide every step of the process: from understanding the incentive structure of the situation, to explaining the varying goals and expectations of the human actors interacting therein.

Humans are semi-rational decision makers (Kahneman, Slovic, & Tversky, 1982; Tversky & Kahneman, 1974) who very often follow rules of thumb (also sometimes referred to as heuristics or default behavioural strategies). The formation of default strategies, and the psychological mechanisms supporting them are a basic tenant of evolutionary

psychology (Tooby & Cosmides, 2002, 2013). Our environment and the challenges we face in it shape our psyche over the course of our evolution, by selecting for behavioural tendencies. If a dilemma-prone situation has occurred reliably throughout human evolutionary history (Caporael, 1994), and carried a high cost of failure (Haselton & Buss, 2000), it is likely to result in a psychological mechanism to promote a behaviour which reliably solves the dilemma<sup>5</sup>. My contention is that structural characteristics of the interaction and the situation affect the application of default behavioural strategies, thus making sGET structurally sensitive.

In intergroup situations, this means that we will expect ingroup favouritism or outgroup derogation to be dependent on situational cues which make them more or less likely to “work”, what is to say solve the dilemma with the least risk and best reward possible for the individual in the long-term. Humans can identify that dilemma due to their sensitivity to situational cues, particularly when it comes to incentive structures which they and their interaction partners face. This sensitivity is not necessarily deliberate, but the result of psychological mechanisms which prop certain default strategies. At the same time, depending on structural characteristics of the environment within which the interaction is occurring, some default strategies will lose effectiveness, while others will gain it. Thus, their application will vary.

The question remains as to why groups would be such powerful cues for behaviour to begin with. Why would humans care about group outcomes, or the outcomes of other group-members? What mechanisms have propped up the construction, and continue to promote

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<sup>5</sup>Solving the dilemma here means achieving the best possible outcome at the least possible risk. It does not mean that dilemma is eliminated, nor does it mean that an optimum outcome is achieved. Since a dilemma may have more than one solution, we can expect the emergence of a variety of strategies, some of which may compete or support each other. The likelihood on of them will dominate and become a default strategy has to do with its evolutionary stability and sustainability (Boyd & Richeson, 2005).

the use of, typical intergroup behaviours? Which structural characteristics are key to their engagement or suspension?

In response to this issue, Brewer started applying an evolutionary perspective to intergroup conflict in her 1999 paper. Originally meant to clarify the difference between ingroup love and outgroup hate, and show that the outgroup is not a necessary reference point to the formation of ingroup love, she suggested a mechanism she called "bounded social cooperation" (Brewer, 1999, p.434). She argued that this mechanism was a fundamental adaptation to group-living. As such, it had left traces on human psychology in the form of behavioural tendencies which are engaged when we think in group categories. From an evolutionary perspective, it is clear that group membership is a fundamental survival strategy for humans (Brewer & Caporael, 2006), a characteristic we share with all other primates (Dunbar, 1992). Furthermore, human groups are characterized by "obligatory interdependence" (Brewer, 1991, 1997; Brewer & Caporael, 2005; Caporael, 1997), meaning that all individuals within it are in some way dependent for their outcomes on other group members. Under those circumstances, building a system ensuring cooperation bounded to the ingroup, makes evolutionary sense<sup>6</sup>.

According to Brewer, this system should be based on trust. An indispensable part of cooperation (Deutsch, 1983; Kouzes & Posner, 2002), Brewer suggests that within-group trust is depersonalized and generalized to all group members. Indeed, we find ingroup members regularly trust each other more than strangers or outgroup members (Brewer & Campbell, 1976; Fiske, 2015). Trust, Brewer argues, is "a form of contingent altruism"

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<sup>6</sup>Brewer's proposed bounded social cooperation is very similar not only to Yamagishi's bounded generalized reciprocity, but also to the parochial theory of the evolution of altruism (Choi & Bowles, 2007). In an effort to explain the evolution of altruism, these researchers have created models showing how altruism could have been supported by intragroup cooperation and intergroup competition. This early altruism was thus parochial, meaning bounded to the ingroup, and limited to ingroup members.

(Brewer, 1999, p.431), extended to ingroup members so that the group can perform cooperative tasks, promote cohesion, defend itself, etc.

The same year as Brewer's article was published, Yamagishi and colleagues put forward the Bounded Generalized Reciprocity approach (BGR; Yamagishi, Jin, & Kiyonari, 1999; Kiyonari, Tanida, & Yamagishi, 2000; Yamagishi & Mifune, 2009; Yamagishi, 2007) which explained how exactly this depersonalized trust is supposed to be attained and why it is necessarily limited to the ingroup<sup>7</sup>. The key is a systematic and reliable network of bounded generalized exchange which is established between group members through repeated interactions, as well as the expectation of future interactions (what Axelrod (1984) called "the shadow of the future"). In essence, one is likely to interact with ingroup members more frequently and more reliably than with outgroup members. As such, one is more likely to receive reciprocal treatment of their behaviour from ingroup, rather than outgroup members. Humans use reciprocity as one of the basic strategies of interpersonal behaviour (Axelrod, 1984; Boyd & Richeson, 1988; Trivers, 1971). This is true for other primates, mainly the anthropoid apes. For example, bonobo and chimps, our closest living cousins, share large fruits and meat in the wild (Boesch & Boesch, 1989; Goodall, 1963; Hohmann & Fruth, 1993; Jaeggi & van Schaik, 2011; Kuroda, 1984; Teleki, 1973) and in captivity, given that the food is attractive enough (de Waal, 1989; 1997). It is not only food that gets shared under the assumption of returning favours, but also grooming, a typical social activity of many primate species (Machanda, Gilby, & Wrangham, 2014; Xia et al., 2012). At least partially, the food sharing and grooming activities are motivated by

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<sup>7</sup>Yamagishi would refer to this system not as a system of trust, but a system of security (see Yamagishi & Yamagishi, 1994; Yamagishi, 2011). In other words, ingroup members do not have to trust each other, but only the sanctioning and monitoring systems in place, reliably targeting those group members who violate norms. In fact, he argues that such a system of security destroys trust, as well as the capacity of individuals to predict who will cheat (Yamagishi, Kikuchi, & Kosugi, 1999).

reciprocity. This means that they are either the result of gratitude for previously rendered favours, or the expectation that the favour will be returned (Gurven, 2004a, 2004b; Jaeggi, Burkart, & Van Schaik, 2010; Silk, Brosnan, Henrich, Lambeth, & Shapiro, 2013).

Of course, this reciprocity does not only have to be positive. Negative reciprocity (varyingly conceptualized as punishment or retaliation) is another basic mechanism of interaction (Bruni, 2008; Friedman & Singh, 2004; Gouldner, 1960). For example, people will go against their own self-interest to punish unfair offers made to them in the Ultimatum Game (Gueth, Schmittberger, & Schwarze, 1982; Yamagishi et al., 2012). This is true not only for humans, but also for chimps (Brosnan & de Waal, 2014; Proctor, Williamson, de Waal & Brosnan, 2013). Not only that, but humans will spend their own reward to punish unfair behaviour they had observed, even if it does not impact them directly, as seen in the Third Party Punishment game (e.g. Fehr & Fischbacher, 2004; Shinada, 2009; Yamagishi et al., 2012). Furthermore, they will punish freeriders (non-contributors) in games dealing with group resource management, such as the public goods game or the common resource dilemma (for meta-analysis, see Balliet, Mulder, & Van Lange, 2011; for literature review, see Fehr & Gächter, 2000).

Thus, positive reciprocity between individual group members is thought to promote cooperation, while negative reciprocity stabilizes it (Fehr, Fishbacher, & Gächter, 2002; Fehr & Schmidt, 1999; Gintis, 2000; Guala, 2012), helping promote and validate moral standards of the group (Vidmar, 2002). Furthermore, this system is generalized, meaning that the reciprocity can be either direct (administered by the target) or indirect (administered by a non-affected party). Group members in particular, given the likelihood of repeated interaction, can expect their behaviour will be reciprocated not only by the initial target, but by all the ingroup observers, and beyond. “Beyond”, once we consider

reputation transference and management (Mifune, Hashimoto, & Yamagishi, 2009). In game-theoretical terms, reputation can be conceptualized as the information about previous behaviour of an individual or a group of individuals, used to predict future behaviour. Crucially, such information is more likely to be exchanged within the groups, rather than between them, additionally supporting the network of reciprocity. Thus, positive treatment of ingroup members, with whom one will interact often and repeatedly, is likely to elicit positive reciprocity and a positive reputation. Negative treatment of ingroup members is likely to cause negative reciprocity and a bad reputation. On the other hand, outgroup members are unlikely to be encountered regularly, and therefore unlikely to consistently reciprocate behaviour<sup>8</sup> or transfer reputation information.

We can conceive several simple default strategies just from these observations:

1. It is always better for the individual to treat the ingroup members positively, for they are likely to respond in kind.
2. Failing to treat the ingroup positively runs the risk of receiving negative reciprocity from ingroup members.
3. Unless groups are facing a zero-sum game (meaning, a win-or-lose situation), it is best to leave outgroup members alone, and to treat them fairly if possible.

Indeed, this is what the experiments have shown. Yamagishi and colleagues demonstrate that the necessary conditions for intergroup bias to occur, apart from group

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<sup>8</sup>I would argue outgroup members are still likely to reciprocate negative behaviour for several reasons. Firstly, failure to address an offence sends a signal that one is exploitable. This can reduce the individual's status and damage their reputation within the group. It can also invite others to attempt to cheat or dominate the individual. Secondly, an unanswered offence against a group member lowers the group's status by the same token, affecting all ingroup members. Thirdly, in intergroup situations, failing to protect or retaliate on the behalf of an ingroup member can create uncertainty and strife within the group. If we assume one of the functions of a group is to ward off other groups (Kameda & Tindall, 2006) with hostile intentions, failure to do so for an ingroup member can crack the system of depersonalized trust and damage group cohesion.

categorization, are opportunities for reputation management (Foddy, Platow, & Yamagishi, 2009; Mifune, Hashimoto, & Yamagishi, 2009; Mifune & Yamagishi, 2015; Platow et al., 2012; Yamagishi & Mifune, 2008; Yamagishi, Hashimoto, & Schug, 2008), and expectations of future reciprocity by ingroup members (Gaertner & Insko, 2000; Karp, Jin, Yamagishi, & Shinotsuka, 1993; Platow, Grace, & Smithson, 2011; Rabbie, Schot, & Visser, 1989; Yamagishi, Jin, & Kiyonari, 1999). Without those in place, intergroup bias is suspended. It makes no sense for individuals to distinguish between the ingroup and the outgroup if these groups cannot perform their evolutionary function of impacting that individual's fitness.

To summarize, the BGR system explains why group members would be concerned with the outcomes of other group members, and therefore, with the outcomes of the group – given interdependence, those outcomes directly impact their own through the network of generalized reciprocity. The beliefs about ingroup interdependence seem to be so basic that they spill over into minimal experiments, accounting for the intergroup bias we find as a result of “mere categorization” (Yamagishi, 2007). Moreover, they are in part shared by apes other than humans. We can say that bounded generalized reciprocity is how ape groups work, and are assumed to work by the group members. The moment the network of exchanges stops functioning reliably, groups cease to carry meaning for the individual, and therefore no longer impact her behaviour. As long as it functions (or seems to function), it continues (as it has in evolutionary past) to prop up the default strategy of ingroup favouritism and, in some cases, outgroup derogation.

We can put together the sGET perspective on intergroup conflict into the following several points,

1. **Groups are indispensable for human survival.** They are networks of interdependent individuals who share a generalized trust and exchange. Both the trust and

the exchange rely on group members' willingness to contribute to its maintenance. Psychological mechanisms to support this trait, such as social identity, are in place, making the "group" an important situational cue for human behaviour.

2. The interaction within and between groups has engendered a number of dilemma-prone situations humans have had to solve. Over the course of our evolution, this has led to the formation of **situation-sensitive behavioural heuristics in group situations**.

3. Behavioural heuristics for intergroup situations tend toward the cautious and parochial, **meaning they minimize the risk of incurring a large cost by advocating ethnocentrism**. Since the ingroup is more likely to reciprocate positive and negative behaviour, they should be preferred in all dilemma situations.

4. The application of intergroup behavioural heuristics will depend on situational characteristics, and the perception of the situation by relevant actors. This means that two questions suggest themselves when looking at intergroup dynamics from a sGET perspective: **How do different situational characteristics impact human intergroup behaviour? How do different situational characteristics contribute to the perception of intergroup situations?** In this thesis, I will mostly be concerned with the former question, investigating the impact of realistic situational factors on behavioural responses.

How does this help understand the complex dynamics between minorities and majorities? In the next section of this chapter I will finally discuss the application of sGET, as I have laid it out, to the research questions. In essence, if we consider minorities and majorities not as separate entities, but as distinct groups existing together within the framework of a larger, functioning group, we can begin to understand the default strategies which promote conflict between them. Thus, I will be looking at the impact of common



resource management and group-size as two structural characteristics which, I argue, can fundamentally influence human intergroup behaviour.

### **Minority v. Majority: A Structural Goal/Expectation Theory Approach**

As I have discussed before, previous research on the topic of minority and majority dynamics has found conflicting results. In real life, we see majorities and minorities both discriminating against each other, with majorities in particular expressing strong negative views of minority communities or even their possible presence. Meanwhile, in the lab, in minimal situations, minorities are the ones more often engaging in discrimination. Obviously, there is a disconnect between reality and experimental studies. I argue that the problem lies in our theoretical and methodological conceptualization of minorities and majorities. More precisely, they should not be equivocated with the traditional ingroups and outgroups, as is often the case in literature. Rather, minorities and majorities are here defined as distinct groups of unequal size which are nevertheless interdependent, i.e. they recognizably belong to the same, functioning superordinate group. I argue this definition reflects the reality of their dynamics better than the independent ingroup and outgroup model most often used in research. To illustrate what I mean, we may compare Turks living in Turkey, as opposed to Turks living in Germany. To the majority German population, the first is an outgroup, while the second is what we may call an “ingroup other”, a salient subgroup with which they inhabit a common space, share institutions, decide upon state policy, et cetera. In other words, Germans are less interdependent upon Turks in Turkey than they are on Turks in Germany. I argue that once this aspect of minority / majority dynamics is recognized, we can begin to unravel the reasons for some of the issues with diversity I have mentioned above. In fact, these issues are inherent in the structural characteristics of minority / majority interaction.

More precisely, I contend that the minority stands to gain from defecting on common resource management and sharing the gains amongst themselves. The majority, on the other hand, cannot exploit minority contributions in the same way – on the group level, majority members can never outperform the scenario where everybody cooperates. This asymmetry of incentive structure has several negative implications. Firstly, it will skew the majority's expectations of minority cooperation in the common resource management dilemmas. I argue that the majority will expect minority members to behave parochially and freeride on group resources in order to benefit themselves, as well as other minority members. Secondly, once we consider the fact generalized reciprocity has trouble working over group boundaries, opportunities for singling out and punishing individual defectors will be slim. At the same time, as Miguel and Gugerty (2005) already argued, any institutional system of sanction for norm-violators will likewise encounter problems.

Thirdly, the common resource management dilemma of minorities and majorities ticks all the boxes for the formation of default strategies: it has occurred reliably over human evolutionary history, and it carries a high potential cost if mismanaged. Ostensibly, if a minority is allowed to continue amassing capital at the expense of majority contributions, not only will the minority eventually monopolize the resource as a sort of economic elite, but the resource itself might collapse.

For all of these reasons, from a sGET perspective, we would expect majority members, if conscious of common resource management occurring between the minority and majority, to show greater intergroup bias. More precisely, this bias will take shape of outgroup hate – a deliberate detraction from another group's resources. Below, I will make my case for this prediction by taking into consideration previous research on the topics of ingroup derogation, punishment of norm-violators, and the management of group resources.

Evolutionarily speaking, there is a fundamental difference in how humans treat ingroup members as opposed to outgroup members. Obviously, one part of that is ingroup favouritism, what is to say favourable treatment of members of one's own group. However, the flip side of that coin is ingroup derogation, what is to say harsher punishment of ingroup rather than outgroup norm-violators (Mendoza, Lane, & Amodio, 2014; Shinada, 2009; Shinada, Yamagishi, & Ohmura, 2004; cf. Valenzuela & Srivastava, 2012; Kubota, Bar-David, Banaji, & Phelps, 2013).

On the attitudinal level, the phenomenon is called the Black Sheep effect (Marques, Yzerbyt, & Leyens, 1988; Marques & Yzerbyt, 1988; Branscombe, Wann, Noel & Coleman, 1993; Castano, Paladino, Coull, & Yzerbyt, 2002; Coull, Yzerbyt, Castano, Paladino, & Leemans, 2001; Marques & Paez, 1994; Otten & Gordijn, 2014). In essence, deviant members of the ingroup are evaluated more negatively than outgroup members with the same characteristics. For example, Marques and Yzerbyt (1988) had philosophy students evaluate speeches supposedly written either by fellow philosophy, or law students. One of the speeches was written poorly, while the other was written well. Crucially, participants evaluated the badly composed speech more negatively if they thought it had been written by an ingroup rather than an outgroup member. Researchers dealing with the Black Sheep Effect contend that ingroup deviants are perceived as an inherent threat because they damage the group's reputation (Marques, Abrams, Paez, & Martinez Taboada, 1998), threaten the maintenance of a positive social identity (Abrams, Marques, Bown & Henson, 2000), blur intergroup boundaries (Jetten, 2006; Jetten, Spears, & Postmes, 2004), and may spread non-normative behaviour within the group (Ouwerkerk, Kerr, Gallucci, & Van Lange, 2005). More than that, they "hinder group locomotion (the group's ability to achieve goals; e.g. Festinger, 1957) [...] Because their current behaviour is unexpected, predictions

of future behaviour are also likely to be less certain" (Frings, Hurst, Cleveland, Blascovich, & Abrams, 2012, p.108). Little surprise then that ingroup deviants and norm-violators evoke negative emotions, including anxiety on the biopsychological level (Frings et al., 2012).

Ingroup derogation is more than a bias of attitude, however. Applying sGET, Shinada and colleagues (Shinada, Yamagishi, & Ohmura, 2004) argue that, since cooperation is necessary to maintain the benefits group members experience from belonging to the group, punishment of non-cooperators (conceptualized as a second-order social dilemma<sup>9</sup>) will therefore be more prominent in the ingroup rather than the outgroup. To examine this, they conducted a gift-giving game in which participants were separated into two 4-person groups. They were told another such group with participants hailing from another *gakubu* (roughly equivalent to a college or academic discipline) will be playing the same game. Each round, three of the four participants in the cell were given JPY 200 by the experimenter, and told they could allocate any part of that to one other group member. The allocations occurred in a daisy chain. The first allocator would gift the second, the second would do the same for the third participant, while the third would allocate to the first in a cycle of gift giving. Any amount the three participants choose to allocate to one another is doubled by the experimenter before being passed on. This game represents generalized reciprocity, and can be interpreted as a public good. The fourth participant in each cell, however, is given the role of observer. This participant would be playing a Third Party

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<sup>9</sup>A first order social dilemma is the trade-off individuals have to make between their own, and collective outcomes when it comes to the generation of group resources. The question for the individual is, Why should I contribute if others can do it instead? The second order social dilemma is the trade-off between the benefits of the resource and the costs of supporting its generation through costly reward or punishment. The question for the individual is, Why should I punish freeriders or reward cooperators if others can do it instead? In other words, in the second order social dilemma, individuals have to choose whether to contribute to the solution of the first order social dilemma.

Punishment game, meaning they will decide whether any of the contributors should receive a punishment. The punishment is costly to the observer who has to give from their show-up fee in order to administer it. Shinada and colleagues' results show that people are more willing to punish ingroup rather than outgroup cheaters, as predicted by sGET.

Berhnard, Fehr and Fischbacher (2006) conducted an allocation game between two small-scale, tribal communities on Papua New Guinea. They followed up the allocation game with a punishment phase in which participants could expend some of their own winnings to sanction an allocator. The experiment showed that people are willing to pay a cost to preserve norms of fairness and sharing, but only if the recipient of the unjust exchange was a member of their own tribe. Thus, not only did people negatively reciprocate outgroup members who behaved unfairly towards ingroup members, they did the same to ingroup norm-violators. Since the same action did not occur when observing an unfair exchange between two outgroup members, we can conclude this is not a matter of abstract justice. Rather, it demonstrates a mechanism of intragroup cooperation maintenance at work.

Goette, Huffman and Meier (2006) found similar results with new recruits to the Swiss army who were randomly assigned to platoons. This was an experimentally interesting situation since participants had no previous interaction with each other, yet could be certain to interact with group members in the future, making the interdependence aspect of group membership especially poignant. They likewise found the willingness to enforce a cooperative norm was higher when the offender was an ingroup member.

Parks, Joireman and Van Lange (2013) conclude ingroup derogation was and is an adaptive strategy primarily aimed at maintaining group resources. Generation, maintenance and redistribution of group resources is a social dilemma which all human

groups had to solve (Parke, Joireman & Van Lange, 2013), and which is one of the most characteristic activities of human groups. While other primate groups have some sort of generalized reciprocal exchange which serves a similar purpose, it is unlikely they consciously generate and sustain group resources the way humans do. When it comes to resource management in human groups, we can talk about two basic models, the Public Goods game and the Common Resource dilemma. In the first, participants decide how much to actively contribute to the establishment of a resource, while in the second, they decide how much of the resource (which may or may not replenish after use) to take for themselves. Unsurprisingly, the first is sometimes called the give-some dilemma, while the latter, the take-some dilemma. To give a few examples, social security, public health insurance, and public welfare are examples of give-some dilemmas, while management of water sources, fossil fuels, or communal pastures are examples of take-some dilemmas. The dilemma itself is not that different - in both cases, each individual would benefit by taking more or giving less, while everybody else cooperates fully. In other words, each participant in the dilemma would be better off if they defected and became a freerider. However, if all participants acted on such short-term profit maximizing motivations, the resource itself would collapse, and everybody would be worse off.

Significantly, this sort of generation, exchange and maintenance of common goods occurs within the group. As with the bounded generalized reciprocity system, common resource management in intergroup situations has already been shown to engage psychological mechanisms. Importantly for my argument, Dawes, de Kragt, and Orbell (1988) showed contributions to the public good are moderated by whether the resource will primarily benefit ingroup or outgroup members. The researchers showed cooperation in the Public Goods game is enhanced by discussion only when the beneficiaries of the cooperative

efforts are ingroup members. When the benefits of cooperation in the game went to the outgroup, cooperation levels dropped, despite the fact participants indicated their willingness to cooperate during the discussion stage.

Habyarimana, Humphreys, Posner and Weinstein (2007) conducted a series of economic games in a slum neighbourhood of Kampala, Uganda. Participants were variously paired with co-ethnics or non-co-ethnics. Apart from the expected finding that community-level ethnic diversity impedes the provision of public goods, they also found that this result has little to do with the perceptions of similarity, or greater ethnocentrism, i.e. positive attitudes towards ingroup members. Rather, it is the effect of strategic decision-making: participants expected they would see a greater return on their investment from co-ethnics, and that the sanctioning systems in place are more likely to function within, rather than across ethnic lines. Again, this is what sGET predicts.

Finally, Hugh-Jones and Perroni (2014; 2017) have been investigating the phenomenon of expropriation, i.e. the confiscation of an individual's good acquired in the Public Goods game by other players. They contend that small-scale societies – the best model we currently have of early human groups in the Pleistocene – do not engage in individual punishment, because it is overly risky. Neither do they engage in a depersonalized institutional punishment; rather, the community achieves a consensus about the target and the severity of the expropriation, after which it is carried out by representatives. Replicating this system in the lab showed that the targets of such confiscation are often non-prototypical ingroup members<sup>10</sup>.

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<sup>10</sup>Interestingly, Hugh-Jones and Perroni (2017) found no evidence that heterogeneity per se reduces contributions to the public good, in opposition to the macro-level, real-world findings by sociologists and economists.

To summarize, groups are more than just vessels of generalized reciprocity. In human societies, they are also vessels of common resource management. Individual group members are sometimes willing to detract from their own rewards to make sure the dilemma inherent in resource management is solved, by punishing norm-violators particularly harshly if they are fellow ingroup members. As such, heterogeneous groups face a problem of how to deal with freeriding across group boundaries. The experimental and real-world results indicate that ingroup members then overcompensate by targeting non-prototypical members. While some of the studies I have presented here deal with individual non-prototypical members, there is no reason to suspect the mechanism would be any different for a whole group of non-prototypical members, e.g. an ethnic, political, religious, sexual, or cultural minority. In fact, there is good reason to suspect they would be seen as even more culpable.

Again, this is an issue of heterogeneous groups; not an issue of two independent groups. Thus, when we speak of minority / majority dynamics, it makes no sense to speak of them as merely two groups of unequal size. In modern times, they are also two groups engaged in resource management together, but lacking the system of depersonalized trust which Brewer (1999) deemed so important for the management of group resources, and the maintenance of a group identity. In fact, in a single footnote in the 1999 paper, Brewer mentioned how this fact is likely to disrupt cooperation between groups, even if both groups should have the same goal<sup>11</sup>, i.e. generating a common resource.

What we know from previous experiments is that, testing merely for intergroup bias between groups of unequal size shows greater discrimination on the part of the minority – a

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<sup>11</sup>This prediction is in direct conflict with Realistic Conflict Theory (LeVine & Campbell, 1972; Sherif & Sherif, 1953; Sherif, 1966), which suggests that common goals between groups should make peace.



result not often seen in the real world. From a sGET perspective, we can interpret these results as the effect of relative group size – if groups are seen as networks of interdependent individuals who engage in generalized exchange, than the smaller the group the more effective the exchange will be. Smaller groups have more opportunities for mutual monitoring, reputation management, exchange of goods, favours and information, as well as punishment and sanction. Establishing a working system of generalized reciprocity is relatively simple. Larger groups, in comparison, suffer from greater coordination problems. The larger the group, the lower the chance of encountering the same group members again, and thus the greater the chances of getting away with cheating them. Even if group members are willing to behave in a normative way, larger group size means more errors will occur in that process, including errors of communication and memory (Stevens, Volstrof, Schooler & Rieskamp, 2010), infecting the network with defection. In addition, there is a cognitive cap-off to any individual's capacity to maintain meaningful relationships with other individuals (Dunbar, 1992; 2010), which is reached and surpassed in modern, large scale societies. In other words, the larger the group, the more difficult it is to maintain a sense of community within it. This problem of big groups has been seen as fundamental to the development of modern states (Hugh-Jones & Perroni, 2014), and even the emergence of religion (Norenzayan, 2013).

Thus group size, and particularly, relative groups size, is a structural characteristic of the situation which fundamentally impact the ability of humans to solve the social dilemmas they encounter. Indisputably, it is an important element of investigation in minority and majority dynamics. However, I argue this is not enough.

If we frame the interaction between minorities and majorities as two groups also managing common resources together, another effect of relative group size becomes evident.

As I will argue in more detail in Chapter 3, given the structure of n-person social dilemmas like the Public Goods and Common Resource dilemmas, all minority members stand to gain from defecting on the group resources, while the majority cooperates. Meanwhile, the best possible outcome for the majority collectively, is perfect cooperation on all sides. This asymmetry in outcomes exacerbates the dilemma inherent in common resource management. To use the sGET language, setting up a system of common resource management between groups of unequal size skews the predictions about minority members' behaviour in the mind of the majority. Thus, I suggest a default strategy has emerged in which the majority sharing resources with the minority, is likely to engage in a preemptive reduction of minority resources. This action can be interpreted as a type of punishment for crimes not yet committed, and will be motivated by the expectation minority members will cheat on the public good. This makes evolutionary sense, since it can be interpreted as an error managing strategy – it is better to overreact to minority defection than to underreact to it.

Significantly, this does not hold true for the minority. There is no incentive structure or impact of relative group size that would justify their a priori discrimination of an interdependent majority group. Thus, I predict that given group-level interdependence, the bias we had previously observed in independent groups of unequal size will be reduced or suspended. Discriminating against an interdependent majority in an a priori way can neither prevent a costly outcome, nor induce a beneficial one for either minority members individually, or the minority as a whole.

To test this application of sGET to the question of minority and majority dynamics, I asked the following questions,

1. How does consciousness of common resource management impact minority / majority members' predictions about each other's behaviour?
2. How does consciousness of common resource management impact minority / majority members' allocations to minority/majority targets if the allocators themselves are independent of the interaction?
3. How do those predictions and the behaviour relate to one another?

I address these questions in Chapter 3, and add onto them in Chapter 4 by asking:

4. How does consciousness of common resource management impact relations between groups of equal size which either share the common resource, or manage it in parallel?

While I had no predictions attached for the fourth question, making Chapter 4 an exploratory one, my predictions for the first three questions were clear, and based on sGET. Namely,

1. Consciousness of common resource management will induce more frequent and more severe discrimination of the minority by the majority, than the other way around.
2. This will occur even if the individual is not directly involved in the exchange, taking the shape of outgroup hate.
3. The size of the bias will be explained by predicted contributions to the public good.

In summary, I argue that the troubles large-scale human societies encounter as they become increasingly and recognizably heterogeneous, share a structural impetus. Namely, the discrimination members of the ingroup majority demonstrate towards the ingroup minority comes as a result of the two groups sharing the management of common resources. This mismatch between the group boundaries and the interdependence means that

evolutionary mechanisms for solving the freerider problems (e.g. monitoring, sanctioning, exclusion, rewarding) fail. Given that the majority stands more to lose in this process, it is likely that they will resort to any available means to limit or actively reduce the influence minority members can exert on the society as a whole. This will include a reduction in minority economic benefits, or difference maximization, which we can call outgroup hate.

The discrimination which majority members show to the minority may then account not only for the minority's withdrawal from the superordinate group, but also their withdrawal from common resource management, leading exactly to the sort of loss in public goods that the majority feared, and which research has consistently found on the national and local levels.

Several caveats must be added to this. Firstly, only one small part of this argument is tested in the present thesis – namely, the impact that being aware of group-level interdependence has on intergroup bias in different configurations (between interdependent groups of equal or unequal size, as well as between independent groups). I will, of course, explain these configurations in more details in the empirical chapters 3 and 4. As an orientation, however, in Chapter 3 the intergroup bias is assessed between ingroup minority and ingroup majority members, i.e. two interdependent groups of unequal size. In Chapter 4, the intergroup bias is assessed between the more traditional ingroup and outgroup, i.e. groups of (by assumption) equal size. These groups either share the management of the common resource (making them interdependent), or they manage it separately (making them independent), depending on the experimental condition.

Secondly, it is obvious that my predictions of intergroup behaviour in the face of common resource management are geared towards the negative, i.e. towards discovering and explaining discriminatory behaviour. While one of my predictions is that the minority

will show less bias in comparison to the majority, I have little to say as to what would motivate such behaviour other than a lack of comparable motive to discriminate.

In addition, a discussion of my use of “outgroup hate” is in order. As we have discussed already in this chapter, outgroup hate used to be confounded with ingroup love, standing in for any instance of skewed decision-making in intergroup situations. However, we have since began distinguishing between ingroup favouritism / ingroup love, being a deliberate maximization of ingroup outcomes irrespective of outgroup outcomes, as opposed to outgroup derogation / outgroup hate, being a deliberate minimization of outgroup outcomes irrespective of ingroup outcomes. These definitions are behavioural rather than motivational – thus outgroup “hate” does not have to include any actual emotion of hate, just as ingroup “love” does not have to include any feelings of attachment to ingroup members. Rather, the behaviour we can describe as ingroup favouritism can be the result of fear of negative evaluation, rational self-interest, as well as emotional attachment to the ingroup identity. The same way, outgroup hate can be the result of fear that the outgroup will become aggressive, selfish profit-maximization at the expense of outgroup members, or spite, for example. The motivations for both ingroup love and outgroup hate are left an open question, with the acknowledgement that there could be multiple motivations for the same behaviour.

The most common working definition of outgroup hate is that it constitutes a deliberate detraction of the outgroup’s outcomes, even when this action cannot benefit the ingroup. In other words, it is deliberate difference maximization. However, there is a discussion in the literature as to whether outgroup hate should also be costly to the perpetrator. This addition of a personal cost serves several purposes. Firstly, it better models warfare, the ultimate form of intergroup bias, in which individuals are willing to

make absolute sacrifices to damage the outgroup, even if this does not directly benefit the ingroup (in terms of profit maximization). Secondly, introducing a cost to outgroup derogation in economic games removes self-interested, greed-motives, as well as error or boredom. Finally, making the derogation costly increases the strictness of the test.

However, an opposite argument can be made. A strict test which includes personal cost into its operationalization of outgroup hate may let some other behaviours fall by the wayside. These behaviours, while not as costly as aggression, can nevertheless be considered discriminatory and damaging to the outgroup. Think, for example, of the difference between physically attacking an outgroup member, as opposed to anonymously denying them a promotion to a better pay grade. The first is extremely risky and costly to the individual perpetrator, while the other is neither that risky nor that costly, yet potentially very damaging to the victim.

In this thesis, I chose to use the widest possible definition of outgroup hate to capture as wide an array of discriminatory behaviour as possible. Thus, outgroup hate is here defined as any action that lowers outgroup outcomes even if this action does not increase ingroup outcomes. The independent allocation game was chosen for this precisely this purpose. It allows people to benefit the ingroup to the maximum without influencing outgroup outcomes, and vice versa. Any difference in allocation patterns under such conditions constitute a difference maximization. While we cannot say that this difference maximization is aggressive, we cannot deny that it demonstrates discrimination either. A stricter test of willingness to sacrifice personal outcomes to derogate against the outgroup will be left for the next phase in the investigation process, and is discussed in the concluding chapter.



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Doctoral Dissertation: Minority versus Majority

## **Chapter 2.**

### **Structural Origins of Social Identity: An Evolutionary Perspective**

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## **Abstract**

This paper presents an overview of the current literature from the economic games tradition pertinent to the theory of intergroup behaviour, adds to this discussion by integrating self- and structure-based approaches to intergroup conflict. More precisely, I use evolutionary psychology to bring together Social Identity and Structural Goal/Expectation theories.

Groups can be understood as bounded networks of interdependent individuals. As such, they exhibit different types of interdependence, of which I list four. Social identity should be considered a costly signal, useful when negotiating group living within this framework. As such, it could have been selected for over the course of human evolution.

In addition, I argue that social identity and intergroup bias are conditional, depending on how well group members are able to monitor each other's behaviour, punish norm violators, etc. I propose several as-of-yet ignored structural factors which may impact this relationship, and suggest further lines of research.

*Keywords:* Social Identity Theory, Structural Goal/Expectation Theory, interdependence, intergroup conflict, intergroup bias, evolutionary psychology



## Introduction

Social identity has been a central theme of research into human group behaviour since Tajfel and colleagues (1971) demonstrated how easy it is to trigger cooperation within, and competition between groups, by merely implying they exist. These meaningless, “minimal groups” carried with them a clear impact on behaviour, compelling people to favour their own, and derogate against the "other" – a finding repeated over and over in subsequent experimental studies as well as in real life (Balliet, Wu, & De Dreu, 2014; Brewer, 1999; Hewstone et al., 2002). This phenomenon, usually contained under the umbrella term of intergroup bias, is stable across human societies and cultures (Brewer & Caporael, 2006; Yamagishi, Hashimoto, & Schug, 2008), as well as time (Bowles, 2009; Keeley, 1997; Pinker, 2011). It emerges in both micro and macro interactions (Atran, 2003; Van Vugt, 2009), and we can even observe it in other primate species (Mahajan et al., 2011; Wilson & Wrangham, 2003).

The standard explanation for intergroup bias comes from Tajfel and Turner’s work (1986) on the impact of group categorization. With consciousness of groups activated, outgroups become a referent against which the individual can judge the worth of their ingroup. Given that we are individually motivated to maintain a positive rather than negative or neutral image about ourselves, this should mean we are indirectly motivated to positively distinguish the ingroup against the outgroup.

The assumption here is that our sense of self is inextricably connected to group memberships. This connection is social identity: an integral part of the self-concept derived from group membership, and including the emotional, cognitive, and psychological correlates thereof (Turner & Oakes, 1986). Alternatively, social identity has been defined as



those aspects of the self-concept which are shared among group members (Yamagishi & Mifune, 2008), often contrasted with personal identity which is unique to the individual.

However, if social identity theory is examined from an evolutionary perspective, we are left with some awkwardly basic questions. Why has the sense of self become entangled with group membership in the first place? What selective processes could have led to the emergence of social identity? How does social identity respond to differentially incentivized intergroup situations if at all? In this paper, I will present an evolutionary view of social identity, explore its structural origins, and attempt to integrate it with structural Goal/Expectation theory (sGET, Pruitt & Kimmel, 1977; Yamagishi, 1986a, 1986b) in order to get a more rounded view of intergroup processes. My main goal is to present a comprehensive typology of interdependences encountered within and between groups, and explain why they matter to the research on social identity and intergroup bias. I will concentrate on evidence from experimental economic games under the assumption that such de-contextualized paradigms of interactions offer a look into human default responses to certain social situations and stimuli, and thus to their evolutionary adaptations. Finally, I propose some lines of research in intergroup research which stem from my theoretical propositions.

### **Why an Evolutionary Perspective?**

In 1995, David Buss, a prominent proponent of evolutionary psychology, argued that an evolutionary perspective will bring some much needed resolution to the “broad field of psychology (...) [which is in] theoretical disarray” (Buss, 1995, p.1). While “evolutionary” has since become a buzzword in social sciences used in any number of ways, some of which are inappropriate and unscientific (Laland & Brown, 2011), it nevertheless continues to provide the most unifying framework of investigating human behaviour, psychology, and

social dynamics that we have at our disposal. Thus, one reason why an evolutionary perspective should matter to us as researchers is its power to integrate theoretical approaches and findings, and provide clarity in our attempted interdisciplinarianism.

However, when it comes to intergroup behaviour, I would argue an evolutionary perspective is even more crucial. The core assumption of evolutionary psychology is that those situations which reappear reliably over the course of human (pre)history (Brewer & Caporael, 2006; Caporael, 1994) and carry a high cost of failure (Hasleton & Buss, 2000) would act as selective pressures on human biological, psychological, and socio-cultural evolution. They resulted in what we may dub “default strategies”. Default strategies are a set of adaptive responses to certain situations which reduce the risk of incurring an extremely negative outcome. In other words, they are meant to prevent catastrophic loss of fitness. These strategies become integrated into human behaviour, often supported through some psychological or cultural mechanisms.

In intergroup situations, the default strategies we observe seem to tend towards the parochial (e.g. Choi & Bowles, 2007), what is to say ethnocentric. As I will argue below, this makes sense given that individuals are interdependent with their group members, and rely on them for their survival. Crucially, the reliance is relatively more intense and salient than it is for strangers, or members of the outgroup. Thus, humans, by default, will favour their ingroup to the exclusion, and sometimes at the expense of, any relevant outgroup. However, the real question are not the strategies themselves. Rather it is the application of these (parochial) intergroup strategies depending on situational factors we may be able to control or manipulate.

Thus, on the one hand, investigating default responses informs predictions about human behaviour in general. On the other hand, understanding the forces that have

shaped the strategies themselves, by investigating the situations which acted as selective catalysts for their application, allows for more realistic policy making, since the policies would address the situation, not the psychological response to it. Thus, conflict resolution, intergroup cooperation, as well as threat perception or intergroup hostilities, once seen from an evolutionary perspective, become a matter of realistic incentive structures, and people's perceptions of those structures, as I will explain in this text. There is, however, a long way yet to go between evolutionary psychology and informed policy making (Roberts, 2012).

### **A Criticism of Social Identity Theory**

The central prediction of social identity theory (SIT) requires that, as a result of our self-concept being connected to group membership, humans will try to maintain a positive distinction between the ingroup and the outgroup across situations. However, far from being unconditional, intergroup bias of the sort SIT proposes seems to be rather unstable. Here, I offer two criticisms of the theory. Firstly, it incorrectly predicts outgroup derogation should be a default human strategy for any intergroup situation. Secondly, it is insensitive to structural characteristics of the situation which have been shown to impact intergroup behaviour.

Spiteful difference maximization in intergroup situations, i.e. outgroup hate, follows directly from the proposition that humans are essentially motivated to positively distinguish their own group against any referential "other". However, outgroup hate is rarely observed in minimal groups outside of very specific situations. Generally, it seems that rather than increased negativity, attitudes and behaviours towards outgroups are characterized by decreased positivity (Brewer, 1999). For instance, Mummendey and colleagues (1992) asked participants to distribute negative rather than positive resources (a

high pitched, loud noise), and found no significant intergroup bias. In other words, participants were equally unwilling to subject outgroup members to prolonged negative stimuli, as they were ingroup members. Halevy, Bornstein and Sagiv (2008) created the IPD-MD, a Prisoner's Dilemma game in which participants had the choice between favouring the ingroup while detracting from outgroup gains at no additional cost, or merely favouring the ingroup. Overwhelmingly, they chose the latter, indicating that people are not by default interested in maximizing the difference between groups, just in maximizing ingroup benefits.

Secondly, the tendency to commit intergroup bias seems to be context sensitive. In a series of exhaustive research projects, Yamagishi and colleagues identified several mechanisms crucial to eliciting ingroup favouritism (and, depending on the situation, outgroup derogation), namely: opportunities for reputation management (Mifune, Hashimoto, & Yamagishi, 2009; Mifune & Yamagishi, 2015; Yamagishi, Hashimoto, & Schug, 2008), and expectations of future reciprocity by ingroup members (Karp, Jin, Yamagishi, & Shinotsuka, 1993; Yamagishi, Jin, & Kiyonari, 1999; Yamagishi, 2007; also Gaertner & Insko, 2000; Rabbie, Schot, & Visser 1989). When these two are explicitly removed from the paradigm, intergroup bias is eliminated, disputing directly the predictions based on social identity alone.

For example, Mifune and Yamagishi (2015) showed that ingroup favouritism commonly found in the Prisoner's Dilemma game was suspended if knowledge about group membership was not shared. The Prisoner's Dilemma game, perhaps the most famous of the economic games, involves two partners who have to simultaneously make up their minds whether to cooperate with each other or defect. In this particular experiment, the participants played a repeated Prisoner's Dilemma game, meaning they were paired with a

new partner in a series of one-shot interactions. At the beginning of each trial, the players were given 300 yen which they could allocate to the pair in increments of 50 yen. The portion of the money participants chose to allocate would be doubled before being given to the pair. The portion of the money participants chose not to allocate would be theirs to keep. In this way, if both partners allocate the full amount (300 yen) to their pair, they both walk away with the double amount (600 yen). However, if only one participant allocates the full amount, while the other allocates 0 yen, then the cooperator will have nothing, while the defector would have gained 900 yen. This tradeoff between mutual and individual benefit maximization is at the core of any social dilemma.

Usually, when this game is played between groups, we see that people cooperate much more often and to a greater extent with members of their own group, rather than the outgroup. Yamagishi and Mifune's experiment manipulated only the commonality of knowledge of group membership to showcase the impact of both of the mechanisms I have mentioned above: expectation of future reciprocity and reputation management. Participants, recruited from the general population, were repeatedly paired with members of their own, or the outgroup. In some trials, the paired participants knew each other's group memberships (common knowledge), while in some only one of the participants had such knowledge (private knowledge), while the other was given no information about group membership. The ingroup bias was clear only in the common knowledge condition with participants allocating significantly more money to ingroup than outgroup members. This tendency was echoed in their predictions of reciprocal treatment – participants assumed that ingroup members would give more than outgroup members, indicating the importance of expected reciprocity. Mifune and Yamagishi also assessed the participants' Fear of Negative Evaluation (Schlenker & Leary, 1982), and found a significant positive correlation

with ingroup favouritism only in the common knowledge condition. In other words, people were only interested in maintaining their positive reputations with ingroup members if ingroup members were aware of their shared social identity. If the knowledge of group membership was private, the intergroup bias was not significant, nor was it correlated to the need for reputation management.

Thus, research shows that humans are certainly motivated to treat ingroup members positively, but this does not mean that we are compelled to mistreat the outgroup outside of “win-or-lose” (zero-sum) situations in which the ingroup outcomes are interdependent and incompatible with those of the outgroup (e.g. competition). Significantly, ingroup favouritism, while largely automatic, is not unconditional. Humans reflect on the structure of the interaction in order to ascertain if their ingroup favouring actions will impact their fitness. When it is made clear that the group cannot reciprocate the individual’s actions, the group ceases to function, and thus seems to become irrelevant as a category.

This structural, rather than self-based, outlook on intergroup bias is not without criticism. McAuliffe and Dunham (2016) argue that structure-based accounts of intergroup bias are over-complex, and that there is little evidence uniquely indicative of their accuracy. They cite inconsistent findings of harsher punishment levelled at ingroup norm violators (Mendoza, Lane, & Amodio, 2014; Shinada, Yamagishi, & Ohmura, 2003; cf., Valenzuela & Srivastava, 2012; Kubota, Bar-David, Banaji, & Phelps, 2013) but neglect the evidences I have just presented. Perhaps the greatest obstacle to a wider acceptance and use of structure-based explanations for intergroup bias, seems to be their failure to account for social identity, and integrate the knowledge previously attained using SIT. In order to do

so, I will more closely examine a structure-based account of intergroup bias, and its relation to social identity, based on three propositions:

1. Groups can be understood as structured networks of interdependent actors. They serve as powerful cues for behaviour in dilemma-prone situations.
2. Social identity can be understood as a costly signal legitimizing that network.
3. Structural characteristics of the group and the situation will impact levels of social identity.

#### **Groups as Interdependent Networks: Structural Underpinnings of Intergroup Bias**

In 1999, Brewer suggested a mechanism to explain preferential treatment of ingroups without the need for an outgroup to act as a referent. She begins by asserting that humans are group-living creatures for whom sustained positive interactions with conspecifics constitute a fundamental survival strategy. Groups are adaptive mechanisms to deal with a myriad of challenges humans encounter, from securing food, fuel, shelter, and mating opportunities, to acquiring knowledge about the environment, guarding against predators and enemies, and managing contact with outgroups (Kameda & Tindale, 2006). This concept is referred to as obligatory interdependence (Brewer & Caporael, 2006). We see very clearly that obligatory interdependence is older than the Homo species, and a characteristic of all other primates (Dunbar, 1992), indicating that whatever human-specific psychology developed since the dawn of man, it had to have happened within a complex social setting of functionally interdependent individuals. Interdependence is here defined as the impact actors' choices have on each other's outcomes (Kelley & Thibaut, 1978; Rusbult & Van Lange, 2003).

Brewer's second proposition is that altruistic tendencies (or, at least, preferences for mutually beneficial outcomes) must be contingent on the probability that interaction partners will be likewise predisposed to cooperation. Certainly, psychological mechanisms to help us predict the intent of conspecifics have been subject of an arms race between the ability to cheat each other (Machiavellian intelligence; Byrne, 1995) and the ability to detect cheaters (Cosmides, 1989). Conditional cooperation, rather than unconditional cooperation, is an evolutionarily more sustainable strategy if it is based on accurate predictions of others' behaviour. This idea is at the core of structural Goal/Expectation theory which states that human behaviour can be predicted at the intersection of one's preferences (goals), and their predictions of other's behaviour (expectations). Pruitt and Kimmel (1977) use the Prisoner's Dilemma game to showcase what they mean. In order for simultaneous mutual cooperation to occur, each player has to prefer a mutually beneficial outcome, while at the same time predicting that the other player has the same basic preference, or is in some other way motivated to cooperate (e.g. through the threat of punishment). A player who prefers cooperation, but does not think it would be reciprocated by the other party, is likely to defect.

We see support for this idea in the consistent and strong positive correlations between behaviour in economic games and predictions of partner's choices (Yamagishi & Kiyonari, 2000; Yamagishi & Sato, 1986). Evidence from sequential (not simultaneous) Prisoner's Dilemma games shows that people will amend their choices to respond to the first player's choices (Hayashi, Ostrom, Walker, & Yamagishi, 1998; Watabe, Terai, Hayashi, & Yamagishi, 1996). In this way, others' intent to cooperate is rewarded with cooperation, while their intent to defect is met by defection.



Of course, in economic games players have limited information about their interaction partners, and thus can only make such predictions based on their personal attitudes towards human nature in general. In minimal group experiments, however, the salient information participants have is the existence of group categories. Brewer argues that group membership carries with it an implicit depersonalized trust, and constitutes "a form of contingent altruism" (Brewer, 1999, p.431). She further defines groups as bounded communities of mutual trust and obligation that delimit the structural interdependence between group members.

The same year, Yamagishi and colleagues (Yamagishi, Jin, & Kiyonari, 1999) outlined their Bounded Generalized Reciprocity approach to explaining ingroup favouritism. This approach leans heavily on sGET, and can be used to explain the mechanism behind Brewer's proposed depersonalized ingroup-directed trust. Given that human groups are characterized by repeated and reliable interactions between interdependent individuals, we are motivated to have as many positive, and as few negative, interactions with ingroup members. This is in contrast to outgroup members or strangers, with whom we can expect only sporadic and limited interpersonal exchanges. In other words, strangers and outgroup members are less likely to impact our fitness when compared to ingroup members. This has even been shown experimentally – when the interdependence structure is flipped so that the individual is more dependent on the choices of outgroup, rather than ingroup members, they start favouring the “other” (Rabbie, Schot, & Visser, 1989).

To minimize the possibility of committing errors in judgment, and thus exposing ourselves to negative reciprocity from ingroup members, it is better to treat them positively and to favour them over all other interaction partners across situations. Generalized

reciprocity benefits each member of the interdependent network by actively creating incentives to favour ingroup members, entrenching more positive attitudes towards them, and promoting mutual trust. The system is perpetuated through mutual monitoring, information exchange (particularly about other actor's reputations), ingroup norms and institutions, punishment of norm-violators, etc. It supports both positive and negative, direct and indirect reciprocity. Crucially, it allows group members to more accurately predict each other's behaviour. These beliefs about the way group membership works are basic enough to be tied to the very category of group, and thus imported into minimal group situations (Yamagishi, 2007) where they remain unless explicitly suspended. Put more bluntly, Bounded Generalized Reciprocity is how groups fundamentally "work".

What we see from this is that structural characteristics of the interaction between group members mimic economic games – they are structured, incentivized interactions which involve some sort of exchange. Often, they include a social dilemma situation which requires trust. Since the trust is bounded to the ingroup, dilemma-prone interactions between groups serve as cues for the activation of conditional ingroup favouritism and outgroup derogation. They likewise form the only context within which social identity (and social identifying) can be an evolutionarily stable strategy, as I will argue in the next section of this paper. We can extend this logic to define other types of dilemma-prone interdependence that appear in group contexts. I will list and define them below.

**Interpersonal interdependence** is the impact actors have on each other through an informal interpersonal network of exchange, as defined by Yamagishi and colleagues. It is implied by the category of group. As we have seen, when individuals can assume that no exchanges can take place between group members (whether in terms of goods, favours, or information), the levels of intergroup bias are lowered. Ostensibly, when actors are

reassured that the network is in place and functioning well, intergroup bias will increase, as will the levels of social identity.

**Group-level interdependence** is the impact actors have on group resources. Unlike the interpersonal exchanges, which can be described as a series of dyadic economic games, and which take place between individual actors, group-level interdependence would more closely resemble an n-person social dilemma, like the Public Goods game. In it, a group of individuals contribute to the common pot, which is multiplied by a factor  $r$ , and then redistributed to them. If all group members cooperate, they maximize their mutual benefit. At the same time, each individual has a vested interest to defect (i.e. not to contribute to the common pot) and benefit from all others' contributions. However, if all players behaved in this self-interested way, the public good would collapse and all the participants in the game would be worse off.

We can describe it in terms of group resource management, which group members have to generate, maintain, and/or redistribute amongst themselves. Crucially, these resources carry with them the need for group coordination. Typical examples range from relatively simple resources (e.g., hunted meat, fire, constructed shelter), to modern public goods (e.g., social security, public health programmes, free education). Since it is in an individual's short-term benefit to defect on the management of the common resource, but nevertheless profit from it, these all entail a dilemma that group members needed to solve: the freeriding problem.

Recent work by Simunovic (in preparation; Chapter 4 of this thesis) has shown that engaging the consciousness of group-level interdependence results in intergroup bias, specifically difference maximization. Participants were categorized into minimal groups, and told they would perform a series of allocation games to members of the ingroup and

outgroup, who were supposedly taking part in a Public Goods game within the groups. The participants themselves were independent of both the interpersonal exchange structure and the Public Goods game being played by other group members. Nevertheless, in two studies done on student and general samples, they showed deliberate detraction from outgroup profits relative to ingroup profits.

Apart from within-group interdependence structures, **between-group interdependence** is also an important structural characteristic of the interaction which can impact intergroup bias. It is the impact one group's actions have on the outcomes of another group. Competition between groups certainly breeds conflict (Böhm, Rusch, Güreerk, 2016; Zarate, Garcia, Garza, & Hitlan, 2004), and has been suggested to increase social identification with the ingroup (Jetten, Spears, & Masteed, 1997). Perception of threat, whether merited or unmerited, likewise increase ingroup favouritism and outgroup derogation (Burke, Martens, & Faucher, 2010; Jonas & Fritsche, 2013) although this does not seem to extend across all situations (Simunovic, Mifune, & Yamagishi, 2013; Mifune, Simunovic, & Yamagishi, 2017). At the same time, cooperative intergroup contact may lead to less intergroup bias and more positive attitudes between groups (Desforges et al., 1991; Gaertner et al., 1990), although, again, there are some indications that this does not extend to cooperation which entails a salient dilemma (Brewer, 1999; Simunovic, in preparation). Jing and colleagues (2017; see also Deutsch, 1973) suggest that a crucial component in whether interdependent groups will show an increase in intergroup bias will be the beliefs that their interests and goals are aligned (positive outcome interdependence), or discordant (negative outcome interdependence). I add to that by suggesting that even if the outcome interdependence is perceived as positive, yet it entails a dilemma, it might nevertheless

lead to intergroup bias. Brewer (1999) made the same prediction based on the fact that coordinated cooperative action requires trust which simply does not exist between groups.

Finally, we may talk about a **socio-cultural interdependence**, which I will define as the impact actors have on promoting behavioural strategies. In it, the groups and their interactions are perceived on a meta-level, as social representations, stereotypes, or cultural influences. The interaction is likewise symbolic, conceptualized as an exchange of cultural artefacts or concepts. Ingroup deviants, embedded minorities, geopolitically proximal outgroups, as well as portrayals of them in mass media, all pose a potential threat to overturn the established way of “doing things” within the ingroup. Groups like sexual minorities, subcultures, religious or political organizations which seek, or seem to be seeking, a change in generally accepted norms are met with disgust, distrust, and discrimination (Cottrell & Neuberg, 2005). Thus, we are talking about symbolic threat to a group’s values, norms, and established way of life, all of which have been shown to induce greater intergroup bias in behaviour and attitudes (Jetten, Spears, & Manstead, 1998; Stephan & Stephan, 2000). Socio-cultural interdependence has a greater potential impact than that with which we credit it. A fundamental shift in cultural influences can impact the paradigms of what is acceptable behaviour, and thus the expectations of how ingroup interaction partners behave, reducing the necessary trust between group members. However, to my knowledge, this type of interdependence has not been tested in behavioural experiments as a contributor to intergroup bias.

I propose that these four types of interdependence form the framework within which social identity may have evolved, and continues to be a stable adaptive strategy. I further argue any structural characteristic which endangers the reliability of existing strategies to

solve these dilemma-prone situations will impact levels of social identity, and intergroup behaviours.

### **Not Identity, but Identifying**

Towards the end of the twentieth century, the Maori people of Aotearoa / New Zealand began a cultural resurrection of *tikanga*, customary practices, as a means of gaining recognition of "Maori cultural imperatives alongside usual western educational research ethics and procedures" (Ka'ai, 1995, p.112). As part of this movement, there was a re-emergence of traditional tattoo art, including *ta moko*, very characteristic facial tattoos which may seem extreme to many observers outside of this cultural context. Prison tattoos likewise convey deep symbolic meaning both within the group (in terms of hierarchy and personal narrative), and between groups (in terms of allegiance and belonging) (Bronnikov, 1993; Phelan & Hunt, 1998). Archaeological evidence from the Tiwanaku society of South America suggests that cranial modification (elongating or otherwise changing the shape of the human skull) was indicative of ethnic identity within a multicultural community (Blom, 2005). Of course, other, less permanent ways of indicating group membership are available as well. A study by Krakauer and Rose (2008) showed that young lesbians made moderate changes to their appearance soon after coming out, as a demonstration of their group identity, compliance with peer norms, as well as a sexual signal. Authors such as Fox (1987) and Frith (1982) described the typical attire of people from the punk subcultural groups which, while notoriously impermanent and transient on a local level (Yablonsky, 1962), carried recognizable symbolic meaning all over the world.

The purpose of such changes to the appearance was to convey group membership and, importantly, one's commitment to this particular group over all comparable others. In fact, willing body modification has been used to a similar purpose all over the world,

leading some sociologists to dub the body the interface between the individual and their society (e.g. Comaroff, 1985; Lock, 1993). Importantly, all of the behaviours I have listed here can be described as costly signals - behaviours or traits of the individual which carry a cost while at the same time serving as a believable signal to potential interaction partners (Zahavi, 1975; Smith & Bliege Bird, 2000; Sosis, 2000). The more costly the signal the more believable it is, and thus the more likely it is to achieve the desired goal (Smith, 1994). Already several human psychological characteristics as well as quite complex social behaviours have been examined in the light of the costly signalling hypothesis, among them large game hunting (Bliege Bird et al., 2001; Wiessner, 2002), food sharing (Hawkes & Bliege Bird, 2002; Gurven et al., 2000), altruism (Gintis, Smith, & Bowles, 2001; Iredale, Van Vugt, & Dunbar, 2008), and religious belief (Bulbulia & Sosis, 2011; Norenzayan, 2013).

By considering social identity as a signal to interaction partners in dilemma-prone situations we can situate the phenomenon within evolutionary science. The question thus becomes, what are the costs and benefits of demonstrating a high level of commitment to the group, and which selective mechanisms operate on it.

Indeed, the benefits of identifying oneself as a prototypical group member are easy to imagine. High identifiers, provided they demonstrate this internal trait in some way, signal to other group members their willingness to adhere to group norms, including, significantly, the ingroup favouring norm. This, ostensibly, makes them more predictable in interactions, which reduces uncertainty, and is considered an important component of trust (Ring & Van de Ven, 1992; Zaheer, McEvily, & Perrone, 1998). Preferences for prototypicality can be seen in the treatment of ingroup deviants who are often vilified beyond comparative outgroup deviants, while more prototypical ingroup members are seen

in a more extremely positive light than compatible outgroup members (Black sheep effect; e.g. Marques & Paez, 1994). Relative to low identifiers, high identifiers should thus enjoy a higher status within the group, as well as a better reputation. This would expose them to more positive, and fewer negative interactions with ingroup members.

Thus, it pays to identify oneself as a group member, but what are the costs? Firstly, demonstrations of group membership may limit the individual's options to change groups. This opportunity cost could be severe in cases of depletion of ingroup resources, or organized intergroup violence. Under such circumstances, sticking to the ingroup may not be in the individual's best interest. Yet it is possible that high identifiers are willing to forgo this rationale, or are unable to switch groups given their previous actions on its behalf.

Additionally, while high identification with a group and plenty of signals to indicate such membership may protect the individual from random attacks out of fear of reprisal, it does not protect them from deliberate intergroup bias. Those whose group identification is clearly demarcated might be more likely to be targeted for derogation between groups. We can observe this logic in reverse, by seeing how the majority brands deviant members of their group, divergent minorities, and similar "ingroup others". The yellow star, pink triangle, scarlet letter, or a tattoo were used to ostracise those members of the community who belonged to a subgroup of "norm-violators" by making them highly visible and identifiable.

Given obligatory interdependence, social identity as a positively valenced relationship of the self to a network of non-kin could have been selected as a basic psychological trait. In other words, we can think of social identity as a psychological adaptation to help us survive in groups by attaching emotional value to our group identity, and promoting the demonstration of this identity (i.e. identifying). Individuals who signal



commitment to the ingroup should be selected for more positive interaction within the group, but they are also likely to have limited mobility across groups and might get singled out for more negative interaction between groups.

### **Impact of Group Structure on Social Identity: Where to Look?**

There is ample data that the levels of social identification vary between individuals. Luhtanen and Crocker's (1992) work on the development of a collective self-esteem scale clearly showed individual differences in default levels of identification to relevant groups. The same is evident in experimental research where participants differentially identify with the imposed minimal groups. Using this distinction of high versus low minimal group identifiers, researchers have found levels of identification have a moderating effect on intergroup bias (Jetten, Spears, & Manstead, 1997; Roccas & Schwartz, 1993), perceptions of group variability (Doosje, Ellemers, & Spears, 1995), evaluations of ingroup deviants (Branscombe et al., 1993), and levels of ingroup stereotyping (Spears, Doosje, & Ellemers, 1997). These findings clearly show that differential levels of identification have an impact on people's perception, attitudes, and behaviour. Where the individual difference comes from is, however, a separate albeit compelling issue.

If we understand the group as a network of interdependent individuals, social identity could have evolved as a psychological adaptation to group living. I have described it as a costly signal, seeing as high levels of identification may benefit the individual within the group, but are detrimental in between-group interactions. My model implies that the level of identification/identifying should also be dependent on situational cues in social interaction, particularly if these cues impact the reliability and predictability of ingroup members' behaviour, as well as the success of different strategies to solve the dilemmas inherent in group-living.

In this section of the paper, I will briefly list and discuss some structural characteristics of groups that may affect levels of identification and, through it, intergroup bias. I will concentrate mostly on group size and relative group size, since the greatest amount of previous research on the impact of group size is available. Most of these concepts come from social network analyses which have, to my knowledge, not been systematically tested for their psychological impact. Social network analysis is primarily based on the frequency and quality of relationships between individuals (nodes) within a network. It describes quantifiable, manipulable qualities which occur in natural groups. Chief such characteristics are **group size**, **relative group size**, **centrality** (variance in interconnectedness between individuals) and **symmetry** (variance in the reciprocity of relationships between individuals), number of **weak ties** leading outside of the group (connections theorized to serve as bridges for new information; Granovetter, 1973), and **clustering** (variance in relative density within the network). These can vary not only between existing groups, but also between geographical regions, political systems, and over time, giving us a systematic structure-based framework of investigating differences in social identity and intergroup bias across cultures. They impact the reliability and predictability of ingroup members' behaviour within the different types of interdependence they share, and thus, I would argue, levels of identity / identifying with the particular groups and, by extension, intergroup bias.

The brief discussions of each of these structural characteristics of the situation follow the same basic module. First, I will explain what each structural characteristic means in social network theory, and how we can conceptualize it in social psychology. Next, I offer a few words as to why the structural characteristic would influence people's goals,

preferences, and levels of identification. Finally, if possible, I give a prediction as to how the variability along each characteristic could impact behaviour.

The goal of this section is to present avenues of research which have not been explored yet, and present a framework for thinking about them in a constructive way. It is difficult if all, or any, of the structural characteristics mentioned below would have any sort of impact. Thus, what follows should be taken more as an argument for an investigation, rather than an argument for any particular outcome.

1. Experimental data shows that groups relatively smaller in size exhibit higher levels of identification and intergroup bias (e.g., Bettencourt & Dorr, 1998; Otten, Mummendey, & Blanz, 1996). Brewer's optimal distinctiveness theory (1991; Leonardelli & Brewer, 2001; Leonardelli, Pickett, & Brewer, 2010) explains this phenomenon by greater satisfaction with minority social identity which comes as a result of being more distinct than the majority, while still fulfilling the need for inclusiveness. The most intriguing finding of these experiments is that **(relative) group size** in and of itself impacts default levels of identification even in minimal groups. A structural explanation of this effect comes from the effectiveness of smaller, relative to larger groups, in managing the network of interdependent actors. Groups with fewer members are generally more densely interconnected (Kadushin, 2012) and thus are relatively easier to monitor. This means there are fewer opportunities for group members to cheat on each other or freeride on managing group resources with impunity. In other words, smaller groups have a more reliable way of solving dilemmas inherent in interpersonal and group-level interdependence.

Consider a more complex situation of a minority group embedded in a majority, and sharing group resources with them. Now, we are talking about group-level interdependence

between groups of unequal size. Simunovic, Boehnke and Wilhelm (in preparation; Chapter 3 of this thesis) conducted a test of how these two structural characteristics of the group (relative size) and the situation (group-level interdependence between groups) affect intergroup bias. They theorized that relative size will have an adverse effect on predicted contributions to the group resource for the majority, and will thus result in a priori negative bias. Participants, whose personal outcomes were independent of ingroup members' choices or outcomes, were categorized into an embedded minority and majority, and asked to distribute funds to different targets who were engaged in a Public Goods game together. Unlike the predictions made by SIT, the asymmetry was completely reversed. Under these conditions minority members exhibited no significant bias while the opposite was true for the majority. The bias was explained by predicted contributions to the group resources, but not by the degree of identification<sup>12</sup>.

2. High **centrality**, i.e. the variance in interconnectedness between individuals, usually means the emergence of a leader or a leadership organization. Highly centralized groups, as opposed to groups with little centrality, might, as a whole, have higher levels of identification, since centrality has been connected to heightened group coordination (Borgatti, 2003; 2006), as well as a reduction in error (Kadushin, 2012), and therefore predictability of outcomes within different interdependence structures. However, the impact of centrality must in some way interact with the impact of symmetry. **Symmetry** denotes the frequency of reciprocal relationships between individuals, i.e. the number of relationships in which the impact of one actor on another's outcomes is equal in both directions. Lower symmetry means some sort of hierarchy and power imbalance is in place.

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<sup>12</sup>Simunovic, Boehnke and Wilhelm (Chapter 3 of this thesis) only took one pre-manipulation measure of social identity. A more accurate test of whether structural characteristics as I have described them impact social identity, and moderate intergroup bias through it, would be to measure it before and after the experimental manipulations are introduced.

Groups with power pyramids are likely to exhibit differential levels of social identity based on whether the individuals are higher or lower on the pyramid. Given that the more power an individual has, the less dependent they are on the actions of other group members, I would predict their levels of social identification are lower than an individual positioned toward the middle of the pyramid. Thus, the powerful might be less likely to identify with the group which is dependent upon their decisions, and more likely to start identifying with a cluster of other powerful individuals, creating an elite.

3. In his seminal paper, *The Strength of **Weak Ties***, Granovetter (1973) suggested that these standalone connections are “disproportionately likely to be bridges as compared to strong ties, which should be underrepresented in that role” (p.130), meaning that they serve as connectors between networks of individuals, rather than constant and reinforced ties. The larger number of weaker ties between groups should serve a dual purpose. On the one hand, it should lower social identification and intergroup bias for those individuals who have access to the weak tie “bridge”, as predicted by intergroup contact theories (Allport, 1954, 1958). On the other hand, the existence of weak ties might be threatening to those individuals who do not have, or do not seek, such bridges, since weak ties imply permeability between groups. That means influx of new ideas, and a reduction in the boundedness of the group (as well as the exclusivity of the favouritism between its members). Thus, weak ties are a destabilizing agent, both in the context of interpersonal and socio-cultural interdependence.

6. **Clustering (relative density)** is defined as the existence of individuals with greater number of internal connections compared to some equivalent, randomized part of the network (Newman, 2006a, 2006b; Newman & Girvan, 2004; Girvan & Newman, 2002). Such cliques within the group should reduce the predictive abilities of all ingroup members

and thus reduce total levels of social identification. The smaller clique will identify more strongly with their own, denser network and less with the superordinate group than majority which stands outside of the clique. This is demonstrated on real-life minorities who dissociate from the superordinate, majority identity (Branscombe, Schmitt, & Harvey, 1999; Steele, 1997), and prefer distinctiveness over assimilation (Lambert & Taylor, 1990; Verkyuten, 2005). On a group-level, groups with clustering might identify less strongly than groups without clustering, since it reduces the reliability of solving the dilemmas inherent in interpersonal interdependence. However, clustering can also be interpreted as a threat, thus increasing social identity, as well as intergroup bias.

While intergroup bias is certainly a universally human tendency, its frequency and extent differs across societies (Fiske & Derham, 2016; Yamagishi, Jin & Miller, 1998). Structural characteristics of the network can vary not only between existing groups, but also between geographical regions, political systems and over time. This provides researchers with a systematic structure-based framework of investigating cultural variability in social identity formation, intergroup behaviours, and their interaction. For example, groups who have fostered greater density are likely to have less need of a signalling strategy, and would thus be less reliant on social identity as a cue or a proximal mechanism of intergroup bias. Groups with a higher number of weak ties, on the other hand, would have to develop and maintain a more salient relationship to their social identity, express it more often, and relate it more intimately to intergroup bias. The strength of the structuralist approach is that it allows researchers to consider realistic, quantifiable socio-ecological differences between particular groups situated in historical, geo-political, and environmental contexts, without reference to proposed cultural dimensions based on self-reported data, and confounded with personality traits.

## Conclusion

The purpose of this paper was to attempt a theoretical integration of the Social Identity, and Structural Goal/Expectation theories from an evolutionary perspective, and suggest further lines of research that proponents on both sides could consume and engage. I have presented an overview of current literature from the tradition of economic games between minimal groups, with the assumption that this method of data collection gets most closely at human default responses to certain situations and dilemmas. I argue that modern experiments on intergroup bias show social identity is neither unconditional nor fixed, but a dynamic proximal mechanism mediating between behaviour and the perception of a situation. We can explain its origins and functions through the evolutionary lens by positing it exists as a costly signal. Internalized identity cannot be developed and sustained without reference to a benefit of *identifying*. This benefit could have come from the fact prototypical group members (those who exhibit a high degree of social identity) are evaluated more positively than non-prototypical group members, and selected for more positive and fewer negative interactions with other interdependent individuals within the group. At the same time, prototypicality may come at a cost in between-group interactions when high identifiers experience limited mobility and can expect higher levels of discrimination, as well as deliberate targeting by outgroup members. Precisely this cost is what makes it a potent signal in the first place.

I define four types of interdependence that exist within and between groups: interpersonal, group-level, intergroup, and socio-cultural interdependence. My contention is that if any of them are activated, we will observe an intergroup bias. This bias comes as a response to the dilemma which is entailed in each of the interdependence types. Dilemma situations typically require trust, or assurance that the interaction partner will cooperate.

Since no such trust or assurance typically exists between groups, high-cost dilemma-prone situations force humans to respond using error-management strategies, like ingroup favouritism, outgroup derogation, derogation of ingroup deviants. Furthermore, any structural characteristics which prevent or promote, the effectiveness of those strategies, will likewise prevent or promote levels of social identification as well as levels of intergroup bias itself. I propose some lines of research based on structural characteristics of the group taken from social network theory which could be used to falsify my reasoning.

To summarize, social identity can be understood as a psychological adaptation for successful group living. By internalizing and externalizing one's group membership, we create reliable cues for other ingroup members that we are trustworthy and predictable members of the group. These cues are particularly important in any dilemma-prone interaction, of which I have listed four: interpersonal, group-level, intergroup, and socio-cultural interdependence. The reliability of our default strategies to solve these dilemma-prone situations will be impacted by structural characteristics of the groups themselves. As such, they should serve as cues for the ebb and flow of social identity / identifying, and by extension, the emergence or suspension of intergroup bias.



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## Chapter 3.

### Hating the Ingroup Other:

#### Asymmetrical Negative Bias Between Interdependent Groups of Unequal Size

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## **Abstract**

In the face of modern migration trends, communities around the world are becoming more ethnically and culturally diverse. As a result, previously homogeneous societies have to manage their common resources alongside a minority group. We argue that the nature of such group-level interdependence may be a driver of intergroup conflict. Two experimental studies were conducted using student and general population samples respectively. Participants were divided into a minimal minority and a minimal majority, whereupon they were asked to distribute funds to ingroup and outgroup targets in a non-zero-sum allocation game. An additional manipulation was introduced to simulate group-level interdependence between the minority and majority. We predicted asymmetrical negative intergroup bias based on Structural Goal/Expectation Theory. More precisely, we predicted that the majority will exhibit a priori negative bias more severely and more frequently than the minority. Furthermore, we predicted the bias will be explained by expected contributions to the common good. Our results are supportive of these hypotheses. Even though the participants' own outcomes were independent of either the common good or the actions of other allocators, majority allocators sought to maximize the difference between ingroup and outgroup. We discuss the findings from an evolutionary perspective, and suggest future research directions.

*Keywords: intergroup bias, minority, majority, structural Goal/Expectation theory*



“Die Personenfreizügigkeit war dazu gedacht, europäischen Bürgerinnen und Bürgern zu erlauben, in der Schweiz arbeiten zu können. Heute aber steigt die Zahl jener Personen, die – von der Krise getrieben – in unser Land kommen, ohne dass sie über einen Arbeitsvertrag verfügen oder nach einer Kündigung einfach bleiben. Und das auf Kosten des Sozialstaats.”

*"The personal freedom of movement [policy] was made so that European citizens could work in Switzerland. Today however, the number of people who, driven by the crisis, come to our country without a work contract, or stay after the termination of the work contract, is increasing. And this at the expense of the welfare state."*

Guy Parmelin, Swiss People's Party (SVP)

## Introduction

Ethnic and cultural diversity within a society is hardly a new phenomenon, but one which has recently been put front and centre all over the world. Waves of mass migration into Southern and Western Europe are in part a reflection of a longer trend of transnational mobility (Castles, Haas & Miller, 2013; Katseli, Lucas, & Xenogiani, 2006; Sievers, Fassman, & Bommers, 2014) which establishes relatively stable minority communities embedded in the host country's society. Germany, for example, has seen a fourteen-fold increase in populations with migration backgrounds between 1960 and 2003 (BAMF, 2006), with no signs of stopping (Autorengruppe Bildungsberichterstattung, 2016). The same trend is evident in the rest of Europe (Beck-Gernsheim, 2007; Carballo, Divino, & Zeric, 1998), the US (Lee & Bean, 2004; Perez & Hirschman, 2010; US Census Bureau 2009), in Australia and Southeast Asian Nations (Hugo, Wall, & Young, 2015), and elsewhere. Yet hostility towards these migrant communities has likewise been a staple finding (Farrell, 1993; Fuchs, 1995; Kessler et al., 2010; Nelan, 1993; Pereira, Vala & Costa-Lopes, 2010; Takaki, 1989). To compound the issue, migration and increasing heterogeneity of society have become more salient in social discourse (Castles, Haas, & Miller, 2013), seemingly driving the entire political spectrum to the right (Davis, 2012). It would therefore seem that understanding the dynamics of intergroup relations, particularly the relations between minorities and majorities, is as relevant now as it ever was.

In this paper, we address the specific case of minorities and majorities who share the management of a common resource, i.e. they are interdependent on the group-level. Common resource management has been a staple evolutionary conundrum that all human populations had to solve (Dunbar, 1999; Olson, 1965; Parks, Joireman, & Van Lange, 2013). Examples range from the management of clean water sources or pastures, to social

security, taxation, and voting. These can be described as n-person social dilemmas in which each individual has a vested interest to make use of the resource without contributing to its maintenance. However, should all the individuals fail to contribute, the common resource will collapse and all the co-dependents will be worse off. The negative effect of diversity on contributions to the common good (Alesina, Baqir & Easterly, 1999; Alesina & LaFerrara, 2000; Miguel & Gugerty, 2005) and management of an existing resource (Khwaja, 2002; Montalvo & Reynal-Querol, 2005) has been observed in real life, leading Hjort (2014) to conclude that at least part of the issue is due to discrimination between the different groups. However, to our knowledge, there have been no experimental studies seeking to test how consciousness of common resource management impacts intergroup bias between minorities and majorities.

### **Interdependent Minority and Majority**

Previous research on intergroup relations between groups of unequal size has revealed that the minority is more likely to discriminate against the majority than the other way around (Bettencourt & Dorr, 1998; Bettencourt, Miller, & Hume, 1999; Brewer, Manzi, & Shaw, 1993; Hewstone et al, 2002; Leonardelli, 1998; Otten, Mummendey, & Blanz, 1996). Social Identity theory (SIT; Tajfel, Flament, Billig, & Bundy, 1971; Tajfel & Turner, 1979) proposes identity as the proximal mechanism driving intergroup bias, pointing to the fact people are likely to identify more highly with membership in minority groups rather than majority groups (Abrams, 1994; Brewer & Weber, 1994; Luecken & Simon, 2005). Authors have associated this effect with the vulnerability felt when being in the minority (Ellemer, Doosje, van Knippenberg, & Wilke, 1992; Sachdev & Bourhis, 1984, 1991; Simon & Brown, 1987), and greater ingroup salience due to smaller size (Bettencourt, Charlton, Eubanks, Kernahan, & Fuller, 1999; Mullen, Brown & Smith, 1992). Brewer and

colleagues (Brewer, 1991, 1999; Leonardelli & Brewer, 2001) talk about the optimal tradeoff between inclusion and distinctiveness, proposing that minorities have a uniquely balanced identity which creates greater satisfaction.

We present two criticisms of this body of research. Firstly, minorities and majorities have so far been operationalized as two independent groups. Our contention is that in real life situations, minorities and majorities are often embedded into a larger, functional group, i.e. they are interdependent. Apart from a superordinate identity, they share other aspects of groupness, including common resource management.

Secondly, the findings based on relative identification as the mechanism of intergroup bias are structure insensitive. In other words, SIT makes no predictions on how identification levels will change when social situations vary in incentive structures, i.e. in rational motivations for behaviour. Thus, it is not applicable to the particular question of how minorities and majorities will behave in the face of knowledge they are managing a common resource together, since, as we will argue, this particular situation carries specific incentive structures.

In order to tackle this issue, we will apply structural Goal/Expectation (sGET) theory. The core proposition of sGET is that human behaviour can be predicted at the intersection between one's own goals (preferences) and expectations (predictions). Using the Prisoner's Dilemma (PDG) game as an example, Kimmel and Pruitt (1977) argue that simultaneous mutual cooperation arises when both decision makers have a preference for cooperation, and predict that their interaction partner shares this preference. A PDG player who prefers cooperation, but does not predict it would be reciprocated, will defect, as will the player who prefers taking advantage of the interaction partner. Strong support for this

proposition comes from bountiful evidence that expectations of others' behaviour systematically predict individual choices across economic games (Alcock & Mansell, 1977; Croson, 2007; Dawes, McTavish, & Shaklee, 1977; Fischbacher & Gaechter, 2006; Fox & Guyer, 1978; Marwell & Ames, 1979; Orbell & Dawes, 1991, 1993; Yamagishi & Sato, 1986; Yamagishi 1988a, 1988b).

Yamagishi and colleagues (Yamagishi, 1986, 2007; Yamagishi & Sato, 1986; Yamagishi, Hashimoto, & Schug, 2008; see also Gaertner & Insko, 2000; Rabbie, Schot & Visser, 1989, for a similar argument) built on this basis by arguing that the preference and prediction formation happens within a social context which carries specific incentive structures. In other words, the individuals' preferences and predictions will reflect the structural characteristics of the situation. Applied to intergroup behaviour, Yamagishi and colleagues argue that activating group categorization leads to a naive belief among participants that their ingroup is more likely to reciprocate their behaviour than the outgroup in what they call Bounded Generalized Reciprocity (BGR; Yamagishi, Jin, & Kiyonari, 1999). Thus, participants prefer to treat their group members more positively because they predict that the ingroup members can and will reciprocate their actions more often than outgroup members. This belief is even imported into minimal group situations (Yamagishi, 2007). BGR successfully identified several mechanisms which, if removed, suspend intergroup bias, notably reputation concerns (Mifune, Hashimoto & Yamagishi, 2009; Mifune & Yamagishi, 2015; Yamagishi & Mifune, 2008) and expectations of future reciprocity (Karp, Jin, Yamagishi, & Shinotsuka, 1993; Yamagishi, Jin, & Kiyonari, 1999). If the experimental setting explicitly eliminates the naive belief that groups operate as an interdependent unit, the participants cease treating it as a relevant category, and

intergroup bias disappears as a result (see Balliet, Wu, & De Dreu, 2014 for meta-analysis and discussion on BGR v. SIT).

In this way, structural characteristics impact both individual preferences and predictions in intergroup situations. When it comes to the particular case we have identified here—that of a minority and majority managing a common resource together—the structural characteristics of the situation we may consider are, 1) relative group size, 2) the common resource management dilemma, and 3) the mismatch between group identity and interdependence structures. To show why these three are theoretically relevant within the sGET perspective, we must first consider the common resource dilemma.

#### **Asymmetrical Incentives and Group-Level Interdependence**

Kelley and Thibaut (1978; see also Kelley et al., 2003; Rusbult & Van Lange, 2003) defined interdependence as the impact others' choices have on the individual's own outcomes, and used it to explain the shift from immediate self-interest to more prosocial behaviour in dyadic and n-person social dilemmas. Yamagishi and colleagues speak about interpersonal interdependence as the driving force behind BGR, in which the network of indirect reciprocity and reputation provide incentive structures for self-interested individuals to act prosocially (or, rather, in their long-term self-interest). Here, we are discussing a different type of interdependence: namely, the impact other's choices have on the common good the individual shares with them. Such an interdependence is best showcased by common resource dilemmas, which include a public good dilemma and the common-pool dilemma as the two main models. In the former, the dilemma emerges as a result of how much the players contribute to the resource, while in the latter the dilemma emerges as a result of how much players detract from the resource. For simplicity sake, we will use the public good dilemma as our example.

Much like Pruitt and Kimmel's (1977) Prisoner's Dilemma example, the Public Goods game likewise provides a framework within which players examine their preferences and predictions: Shall I cooperate or freeride? Will others cooperate or freeride? We argue that when common resources are managed between two distinct groups of unequal size, the players' preferences and predictions will be moderated by their membership in either the smaller, or the bigger group.

Let us engage a simple thought experiment (see Table 1). Two distinct groups of unequal size engage in a Public Goods Game. The minority numbers 2 individuals (A1 and A2), while the majority numbers 3 (B1, B2, and B3). All of the players have the same initial endowment of 3 tokens which they can contribute to the common pot. The contributions are multiplied by a factor of  $r = 2$ , and redistributed equally to all players.

If all members cooperate (All-C), the maximum size of the common pot is 15 tokens. Once doubled and redistributed, the players can make a maximum of 6 tokens each. Aggregated over group-identity lines, the minority A has received 12 tokens, while the majority B has received 18.

As is the standard case for social dilemmas, however, each individual player has a vested interest to defect on the cost of the public good, and enjoy the benefits. Let us consider what happens on the group level if this defection occurs among the minority, or the majority.

If one of the two minority members, A2, defects on their contribution to the public good, and invests only 1 token into the common pot, the total size of the pot is reduced. Each of the five players then gets 5.2 tokens. In the case of the minority defector, A2, this amounts to 7.2 tokens, when added to the 2 tokens they did not contribute. On the group-

level the minority will, thus, have 12.4 tokens, while the majority will be left with 15.6: the minority will make a profit compared to the All-C situation.

However, if the situation is reversed, and a majority member, B2, defects, the size of the pot is unchanged at 26 after duplication, but the distribution between minority and majority reveals a striking asymmetry on the group-level with the minority receiving 10.4, and the majority receiving 17.6, a reduction for both groups in comparison to All-C.

Table 1. Thought experiment: Public Goods game played by a minority and a majority group. All participants are assumed to have an initial endowment of 3 tokens.

<b>a) All-C Condition</b>					
	Player A1	Player A2	Player B1	Player B2	Player B3
Initial endowment	3	3	3	3	3
Contributions	3	3	3	3	3
Common pot	$15 \times r = 30$				
Individual-level benefit	6	6	6	6	6
Group-level benefit	12			18	
<b>b) Minority Defection Condition</b>					
	Player A1	Player A2	Player B1	Player B2	Player B3
Initial endowment	3	3	3	3	3
Contributions	3	<b>1</b>	3	3	3
Common pot	$13 \times r = 26$				
Individual-level benefit	5.2	$5.2+2 = 7.2$	5.2	5.2	5.2
Group-level benefit	<b>12.4 &gt; 12</b>			15.6	
<b>c) Majority Defection Condition</b>					
	Player A1	Player A2	Player B1	Player B2	Player B3
Initial endowment	3	3	3	3	3
Contributions	3	3	<b>1</b>	3	3
Common pot	$13 \times r = 26$				
Individual-level benefit	5.2	5.2	$5.2+2 = 7.2$	5.2	5.2
Group-level benefit	10.4			<b>17.6 &lt; 18</b>	



We can describe these observations mathematically. The following is a simple expression of the total benefit of participating in the Public Goods game for all players:

$$B_i = r \times \sum_{i=ALL} C_i$$

where B is the benefit attained from participating in the common resource dilemma, and C are the contributions to the common pot.

In the case of All-C, where all contributions equal the maximum, we can express the formula as,

$$B_i = r \times \sum_{i=ALL} E_i$$

Where E is the original endowment before contribution.

What we propose is that the benefits from participating in the PGG and the un-contributed resources (E - C) for the minority are always equal or higher than All-C, while the opposite is true for the majority. Expressed mathematically,

for the minority:

$$\sum_{i=MIN} B_i + \sum_{i=MIN} (E_i - C_i) \geq r \times \sum_{i=MIN} E_i$$

for the majority:

$$\sum_{i=MAJ} B_i + \sum_{i=MAJ} (E_i - C_i) \leq r \times \sum_{i=MAJ} E_i$$

Theoretically, each minority member stands to gain by defecting on the private good and then redistributing the accumulated wealth amongst other minority members. Majority

members can defect, but cannot use those benefits to better the standing of other group members. Thus, on the individual level, minority members have a double incentive to defect, one of which is parochially prosocial, while majority members can only defect out of selfish reasons.

### **A Priori Negative Bias: The Unpleasant Heuristic**

While these observations may be interesting, how do they make any predictions about intergroup bias? In the beginning of this paper, we have quoted Guy Parmelin, a member of the Swiss People's Party which professes anti-minority and particularly anti-immigrant sentiments (Summermatter, 2014). He was one of many to jump on the bandwagon of fear-mongering populism in the last few years, in promoting the idea that migrants to Western Europe are predominantly driven by selfish economic motives, and not by the wars fought in the Middle East, Northern and Central Africa. A major part of this argument resides on the idea that minority communities have come to take advantage of the welfare state, job opportunities and Western democracy, becoming so-called "parasites of the social state". This is evident from the rich body of research on realistic and symbolic threat (Stephan & Stephan, 1996; Stephan et al., 2002) in which participants' ideas that the outgroup will steal jobs and cheat the state contribute to negative attitudes towards them. It seems that there may be at least a naïve understanding of the asymmetry we have described, and it drives not only anti-minority sentiment, but also negative attitudes about the welfare state itself (Gilens, 1996, 2000; Soroka, Harell, & Iyengar, 2013; Schram, Soss, Fording & Houser, 2009; c.f., Peffley, Hurwitz, & Sinderman, 1997; Sinderman, Carmines, Layman, & Carter, 1996). High immigration levels lower support for redistribution of wealth through welfare (Luttmer, 2001; Soroka, Banting, & Johnson, 2006). In a recent paper, Brown-Iannuzzi, Dotsch, Cooley and Payne (2017) demonstrated, for a sample of

predominantly European Americans (79.9%), that support for welfare was negatively impacted by the respondents' assumption the welfare will benefit African Americans. In a more direct test, Soroka, Harrell and Iyengar (2013) ran a vignette study investigating the impact of ethnic identity on the willingness to extend social benefits to minority or majority targets. They used representative samples in the US, UK and Canada, and found that majority targets (ethnically European) were preferred over all the minority targets (ethnically African, East and Southeast Asian).

If the majority believes the minority is likely to skim off the top of the common resource, this, in conjecture with salience of the mismatch between group membership and the interdependence structure, might lead to an attempt by the majority to pre-empt future freeriding by maximizing the difference between themselves and the minority. In other words, we would predict a priori negative bias, or outgroup hate. This prediction not only goes against predictions from SIT, but also against previous research into minority and majority dynamics which showed more intergroup bias committed on the part of the minority (e.g. Brewer, Manzi, & Shaw, 1993).

Outgroup hate, is one of the more elusive phenomena in experimental intergroup research. Although it has often been methodologically and theoretically confounded with ingroup love (in older SIT research, in Tajfel & Turner, 1979, 1986; Turner et al., 1987; also, more recently in parochial altruism research, Choi & Bowles, 2007), the tide of opinion seems to be turning. In her seminal paper on intergroup bias, Brewer (1999) argued for an independence of the ingroup positive and outgroup negative motives. Yamagishi and Mifune (2008; 2015) have likewise repeatedly argued that most of the intergroup bias seen in laboratories are due to motivated positive ingroup bias, rather than outgroup aggression. Halevy, Bornstein, and Sagiv (2008) have provided further compelling evidence. Using a

modified Prisoner's Dilemma game, they gave participants the option of contributing to the ingroup, or contributing to the ingroup while at the same time damaging the outgroup with no additional cost. Default behaviour of the participants seems to have been ingroup love without outgroup hate, even among all-male groups, which have been associated with more intergroup aggression (Van Vugt, 2009; Van Vugt, Cremer & Janssen, 2007; Yuki & Yokota, 2009).

Most significant for the topic at hand is the work Leonardelli and Brewer (2001) have done on minority and majority discrimination. In Study 3 they found that, given the choice between ingroup profit maximization (ingroup love) and intergroup difference maximization (outgroup hate), minority participants chose both equally, while majority participants more often than not chose difference maximization. Based on Optimal Distinctiveness Theory (Brewer, 1991), they propose that majority members are more dissatisfied with the lack of distinctiveness of their group identity. They compensate by maximizing the difference between themselves and the more distinct minority group.

While our predictions are in line with Leonardelli and Brewer's findings, they are based on different starting points. Our contention is that outgroup hate will be exhibited by the majority as a function of their predictions of minority contributions to the public good. Note that this logic holds even if the minority does not in fact take advantage of the common resource as described previously. It is enough that they are able to do so. We propose that the particular situation we have identified here fulfils two criteria set forth by evolutionary psychology, which candidate it for the creation of a default psychological and behavioural strategy. Namely, that common resource management between a minority and majority occurs regularly throughout human history (Caporael, 1994), and that it carries a high potential cost of failure (Hasleton & Buss, 2000). Systematic defection by the minority

will skew the group's resource distribution, creating a ruling elite. Alternatively, the group will fracture, and the common resource itself might collapse as a result. If this is true, we should see non-random behaviour even under minimal, experimental conditions where group memberships are meaningless categories, and the function of the group is suspended as Yamagishi and colleagues indicated.

### Study 1

The purpose of Study 1 was to test whether introducing the consciousness of group-level interdependence is enough to elicit a priori negative bias between a minimal minority and majority. Since the crux of our argument is that majorities have a vested interest to discriminate against the minority if they are involved in a common resource dilemma together, in Study 1 it was made clear to the participants that each group is involved in a Public Goods game (PGG). As discussed, other structural causes of intergroup bias were controlled for, so that the individual allocators were independent of the situations in which their group found itself.

The participants could allocate up to EUR 5 to an ingroup minority member, an ingroup majority member, and a member of the independent outgroup. In this way, each participant performed three non-zero-sum allocations to different targets. They were not able to keep any of the money for themselves. The maximum a participant could allocate to any recipient was EUR 5. Anything under EUR 5 could be interpreted as a deliberate detraction from the best case scenario for that recipient. Conversely, any difference in allocations to targets can be interpreted as a deliberate difference maximization, i.e. an a priori negative bias. We predicted just such a bias would be committed more frequently and more strongly by majority members.

Since the participants were assigned to two experimental treatments (minority membership or majority membership) with three separate measurements (allocations to the minority, majority, and an independent outgroup) a G\*power calculation for at medium effect size  $f = 0.25$  indicated a necessary sample size of at least  $n = 86$  (Cohen, 1977). The calculation was performed using a G\*power calculator (Faul & Erdfelder, 2004).

## **Method**

### ***Participants***

Eighty-seven participants (43 female) were recruited from Jacobs University, an international, English-language university situated in Bremen, Germany. The experiment was conducted on campus, in the Social and Behavioural Laboratory. The mean age of participants was 20. Their cultural, ethnic and national backgrounds were varied, with Germans as the largest national group (16.05%,  $n = 13$ ).

### ***Procedure***

A maximum of ten participants were invited to the laboratory per session. They were welcomed by an assistant who was always female. Upon arriving, the participants selected an ID number, and were led to an individual computer booth. Once all the participants assembled in the laboratory, the assistant announced the beginning of the study. The participants were instructed to input their ID numbers and gender into the computer.

### ***Embedded minimal group categorizations***

The first portion of the experiment dealt with the group membership manipulation. Two separate tasks were used to create embedded minimal groups. The first task (Dot

Estimation Task<sup>13</sup>) categorized participants into a Blue and Green group (in reality, all the participants were categorized into the Green group). The feedback about group membership was displayed in a header for the remainder of the experiment. After the initial categorization, the participants were given a questionnaire (adapted from Grieve & Hogg, 1999) to determine to what degree they identified with the Green and Blue groups. During this time, the assistant distributed green and blue flags, asking the participants to indicate their group membership before handing them the appropriate flag. No participant identified themselves as a member of the Blue group.

Thereupon, the second task (Embedded Figures Task) categorized the participants into a minority (20%) and majority (80%). In the effort to avoid attaching particular values to being assigned to the majority or minority conditions, this division was expressed only numerically, as total percentage of the population. To prevent suspicion, it was implied that the division is based on accumulated previous research, instead of only the scores of people in this particular experimental session.

The categorization was determined by the order of registering the ID number at the beginning of the study. Feedback about their minority-majority categorization was added to the group-identity header and displayed for the rest of the experiment.

### *Individual outcome independence*

After the participants were categorized as minority and majority Green group members (MIN and MAJ conditions), the assistant presented a gambling task. Participants chose a folder which supposedly contained a code determining which task they will perform. Once the participants entered the code into the computer, they were given the instructions

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<sup>13</sup> For a more detailed discussion of the experimental procedure, please view Supplementary Materials.

to the rest of the experiment. First, they were told that they would be paid EUR 10 for their participation. Furthermore, they were assured that their own reward will be independent of their decisions in this task, as well as the decisions of all other participants. All of these manipulations served to break down the naive expectation of reciprocity from other group members (Yamagishi, Jin, & Kiyonari, 1999), and separate the fate of the group from the fate of the individual making the decision.

### *Group-level Interdependence Manipulation*

The participants were told they would supervise a “Public Exchange Task” in which all the remaining participants (hereafter referred to as recipients) in the session would be contributing to a common good for their own group (the Green or the Blue group). The “Public Exchange Task” was modelled on a traditional Public Goods Game (PGG; Ledyard, 1995). The recipients supposedly had EUR 3 available for the Public Exchange task. They could choose to contribute any portion of that reward to the common pot in increments of 10 cents. What they did not contribute, they would get to keep for themselves. Once all the contributions to the common pot were made, the amount would be doubled and redistributed equally to all recipients, irrespective of how much they had contributed. It was made clear to the participants that each recipient can profit from not contributing and keeping the full EUR 3 for themselves, but that the best outcome all around is if everybody contributed the full amount.

In order to make sure the participants have read the instructions, they were given a short questionnaire to check their understanding, as well as two questions pertaining to their predictions about a) how much they would contribute to the common pot were they taking part in the PGG, and b) how much they think most members of the Green group would contribute to the common pot.



Having explained what the recipients would be doing, the participants were shown a decision-making interface which would load three randomly chosen recipients and list their group membership, minority or majority status, and ID number. The participants would then be given EUR 5 per recipient, and could give allocate any amount from EUR 0.1 to EUR 5 in increments of 10 cents. Whatever they choose to allocate to the recipients would supposedly be added to the recipients' gains from the Public Exchange task. The participants were not able to keep any portion of the endowment for themselves.

Each supervisor was presented with three dummy recipients: one from the Blue group, one from the Green group minority, and one from the Green group majority. After all three allocations were completed, the participants were asked their opinions of the recipients' trustworthiness and prosociality (e.g. likelihood that they would "follow the rules, help group members, or sacrifice for the good of the group"). The participants were also asked for their predictions on how much each particular recipient contributed in the PGG, and how much they might have contribute to the supervisor had the roles been reversed. After this, they were paid, and individually led out of the laboratory.

### *Analysis*

The analysis of results will go through several stages. First, the difference in mean allocations to minority and majority targets will be tested for statistical significance using a simple T test. Next, a general linear model will test for impact of between-group variables (minority or majority membership, and sex, as a control variable) upon allocations to minority and majority targets. This is the basic test of our hypothesis that the allocator's group membership will impact allocations to different targets. Next, in a related test, we will calculate the bias score – the difference in allocations to the target most similar to the allocator and the target less similar. The size of the bias will be compared to 0 in a test of

its absolute significance. Thereafter the size of the bias will be related to predictions of different target's contributions to the common resource, and to levels of identification with the group whose membership the participant was assigned. A regression and partial correlation analyses will be used to compare the explanatory power of each of these variables.

## Results

First, we tested whether absolute allocation amounts differed over targets. Overall, minority targets received an average of  $M(87) = 3.24$  ( $SD = 1.67$ ), while majority targets received  $M(87) = 3.48$  ( $SD = 1.48$ ). The difference did not reach significance ( $t(86) = 1.65$ ,  $p = .10$ ). Female participants were more generous, allocating more to both majority ( $M = 3.81$ ,  $SD = 1.35$ ), and minority ( $M = 3.41$ ,  $SD = 1.67$ ) than male participants (to majority:  $M = 3.15$ ,  $SD = 1.54$ ; to minority  $M = 3.08$ ,  $SD = 1.66$ ). This difference reached significance only for the majority targets ( $t(85) = 2.14$ ,  $p = .04$ ).

Our design included one between-group variable (membership in the minimal minority or majority, MMP) and one within-group variable (allocations to minority or majority targets). Thus we performed a repeated measures general linear model analysis and found the within subject effect of MMP on allocations to minority and majority ( $F(1, 83) = 19.6$ ,  $p < .001$ ; (Partial)  $\eta^2 = .19$ ). We found no within-subject effect of sex ( $F(1, 83) = 2.57$ , n.s.), or an interaction between MMP and gender ( $F(1, 83) = .001$ , n.s.). We found no main effect of MMP ( $F(1, 83) = 1.09$ , n.s.), and a marginally significant effect of gender ( $F(1,83) = 3.02$ ,  $p = .09$ ). A pairwise comparison of target identity (minority or majority) and participants' identity (MMP) shows the significant difference occurs in allocations to majority targets (mean difference = 0.26,  $p = .48$ ), but not in allocations to minority targets (mean difference = -0.90,  $p < .01$ ).

A bias score was calculated by subtracting allocation to the outgroup from allocation to the ingroup. Both minority and majority allocators exhibited a bias, but it was smaller in the case of minority ( $M(43) = 0.33$ ,  $SD = 1.09$ ) rather than majority allocators ( $M(44) = 0.79$ ,  $SD = 1.32$ ). The difference was marginally significant ( $t(85) = -1.76$ ,  $p = .08$ ). The bias was significantly different from zero for the majority ( $t(43) = 3.95$ ,  $p < .001$ ), and approached significance for the minority ( $t(42) = 1.98$ ,  $p = .054$ ).

We next turn to the question of predictions of others' average contributions in the PGG, as well as reports of what the participants themselves would contribute to the common pool. Interestingly, the majority expected slightly higher levels of contribution to the PGG ( $M(44) = 1.89$ ,  $SD = 0.86$ ) than the minority ( $M(43) = 1.73$ ,  $SD = 1.10$ ). At the same time, minority members reported higher intended contributions to the common pot in the PGG ( $M(43) = 2.23$ ,  $SD = 1.00$ ) than the majority ( $M(44) = 2.08$ ,  $SD = 0.92$ ). However, neither difference achieved significance in a t-test, nor did either contribute to an explanation of the bias.

We also collected predictions of average contributions in the PGG for the minority and majority targets separately. Majority participants assumed that majority members will contribute significantly more than the minority members (for majority,  $M(42) = 2.17$ ,  $SD = 0.80$ ; for minority,  $M(38) = 1.88$ ,  $SD = 0.86$ ;  $t(41) = -2.32$ ,  $p = .03$ ). The opposite was the case for minority participants (for minority,  $M(38) = 2.06$ ,  $SD = 0.93$ ; for majority,  $M(38) = 1.74$ ,  $SD = 1.03$ ;  $t(37) = 2.41$ ,  $p = .02$ ). However, a regression analysis in which expected minority and majority contributions predict bias, showed that the model is significant only for majority participants, and only for expected minority contributions (see Table 2).

These results were replicated using partial correlation coefficients. Controlling for predicted majority contributions to the public good, minority contributions were

nevertheless significantly and negatively correlated to bias ( $r = -.35$ ,  $p = 0.03$ ) shown by majority members. In the case of minority members, majority contributions were also negatively correlated to bias after controlling for predicted contributions to the public good. However, this correlation was not significant ( $r = -.24$ ,  $p = 0.16$ ).

Table 2. Regression analysis coefficients for expected minority and majority contributions predicting intergroup bias for minority or majority members.

Majority members					
	B	Std. Error	Beta	t	Sig.
(Constant)	1.598	.608		2.628	.012
Majority contributions	.195	.292	.116	.667	.509
Minority contributions	-.638	.274	-.406	-2.328	.025
Minority members					
	B	Std. Error	Beta	t	Sig.
(Constant)	.044	.428		.103	.918
Majority contributions	-.320	.224	-.306	-1.428	.162
Minority contributions	.367	.247	.319	1.488	.146

Next, we tested the level of identification with the ingroup, i.e. the green group, as opposed to the outgroup. On average, participants identified more with the ingroup (Green group:  $M(85) = 4.59$ ,  $SD = 1.13$ ) than the outgroup (Blue group:  $M(85) = 4.3$ ,  $SD = 1.3$ ). The difference between these two was significant ( $t(84) = 2.66$ ,  $p = .009$ ) indicating our minimal group manipulation has been successful. There was no significant difference between the level of identification of the minority ( $M(42) = 4.56$ ,  $SD = 1.12$ ), and the majority members ( $M(43) = 4.61$ ,  $SD = 1.15$ ;  $t(83) = -0.22$ ,  $p = 0.83$ ). While this may seem inconsistent with previous research (e.g., Leonardelli & Brewer, 2001), which found a greater degree of self-

identification with minority rather than majority groups, our measure of identification concerned the superordinate, Green group, rather than the minority or majority membership. Furthermore, the identification with the superordinate group was estimated before participants were given feedback about membership in the minority or majority, meaning that group size could not have impacted the level of identification.

In addition, level of identification did not significantly correlate with the size of the bias (for minority members:  $r = 0.07$ ,  $p = 0.67$ ; for majority members,  $r = -0.05$ ,  $p = 0.74$ ) or predictions of either ingroup (for minority members:  $r = -0.20$ ,  $p = 0.21$ ; for majority members,  $r = -0.19$ ,  $p = 0.22$ ) or outgroup (for minority members:  $r = -0.20$ ,  $p = 0.19$ ; for majority members,  $r = -0.09$ ,  $p = 0.53$ ) contributions to the public good

### **Discussion**

We predicted that, if a minority and majority are interdependent on group resources which are managed in a social dilemma, majority will exhibit more severe outgroup negative bias. The bias exhibited by minority members, on the other hand, will be smaller and rarer. Concordant with our predictions, majority members exhibited negative outgroup bias more frequently and more severely than minority members. In fact, minority members made no significant distinction between allocations to ingroup and outgroup members, unlike the predictions made by SIT or BGR. Importantly, the size of the bias was explained by predicted contributions to the common pot in the case of the majority, justifying our logic. However, the predictions of contributions to the common pot in this study were taken a posteriori, opening the possibility that participants merely justified their behaviour in the allocation game after the fact. Furthermore, allocations to single targets within our experimental paradigm may have appeared as an artefact to participants, or an invitation

to be unjust. After all, why would one person from each of the three different groups be singled out for additional reward? What about the other group members?

In the face of a crisis of replication in social sciences (Schooler, 2014), we are very careful to make more claims based on a single test. Therefore, we conducted another study which studied a different sample in a different experimental setting, and also attempted to address some of the limitations from Study 1.

## **Study 2**

The purpose of Study 2 was to address the short-comings of Study 1, particularly the fact that a student sample was studied, and that the extent of deception was fairly high. For this reason, an online platform (Prolific Academic; see Peer, Brandimarte, Samat, & Acquisti, 2017, for review of Prolific's sample, response rate, and data quality) was used to recruit an online sample, and the experimental design was streamlined.

The participants would once more be allocating to minority and majority members of the same group who would be playing the PGG together. In an effort to make the results more robust, each participants allocated money to three minority and three majority targets.

As in Study 2, the main behavioural measure was an independent allocation game in which the participants would be able to allocate up to GBP 3 to each recipient. Because of the smaller amount available for allocation and the fact the study was taking place online, we anticipated small effect sizes ( $f = 0.15$ ). We found that the necessary sample size of at least  $n = 98$  (Cohen, 1977). The calculation was performed using a G\*power calculator (Faul & Erdfelder, 2004).

## **Method**

### *Participants*

Ninety seven participants (48 female) were recruited via Academic Prolific, an online platform which recruits participants from the general population for participation in online studies. Academic Prolific has a database of over 50,000 potential participants, most of whom have been recruited during college years. This means that the sample has a higher education level than the general population. Ages in the sample ranged from 16 to 64, with the average being 29.

### *Procedure*

Participants were invited to the study via their Academic Prolific accounts. The link to the study was sent to them automatically. Most participants pre-registered for the study and completed it within the next two or three days, so that the entire data-collection of the study was done within a week.

After they input their ID and gender, participants were given the Dot Estimation task. Unlike in Study 1, in Study 2 this single task was used to split them into majority and minority members of the Green group. The Blue group was once again merely implied. Thus, in the minority condition, the participants would be told that they “are a member of the GREEN group. [Their] scores in the perception task have been similar to 20% of other participants who have been members of the GREEN group.” This header was permanently displayed at the top of the page. After the minimal group categorization, the participants’ level of identification with the Green and Blue groups was ascertained.

### *Behavioural Measure*

The participants were told they were going to act as supervisors of a parallel study in which six international students (hereafter referred to as recipients) are taking part in a

public exchange task hosted by Jacobs University. For their efforts, the participants would receive GBP 7.5<sup>14</sup>. This amount was fixed and neither the experimenters', other participants', nor the participant's own actions would impact it.

With this in mind, the participants were presented with the Public Exchange task that the recipients would supposedly be performing<sup>15</sup>. They were told that the recipients were given GBP 2, and asked to decide how much of that money to donate to a common pot. The contributions to the common pot would be doubled and redistributed equally among the six Green group members. The participants were given a concise understanding check at the end of the instructions, and were asked their predictions about (a) how much they would contribute to the common pot were they taking part in the public exchange task, and (b) how much most people would contribute to the common pot.

Then, the participants were familiarized with the decision-making interface and their participants task. Apart from allocating money to each of the six targets, the participants were also instructed to predict each target's contributions to the PGG. As in Study 1, they were told to allocate at least 10 pence to each participant. The maximum they could give to each participant was GBP 3. They could keep none of the money for themselves.

After the participants made their decisions, they were given a post-experimental questionnaire dealing with their understanding of the task, the conceptualization of

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<sup>14</sup>GBP 7.5 is not equivalent to the EUR 10 our student participants received in Study 1. The currency and amount were dictated by Academic Prolific.

<sup>15</sup> Since the first author is planning to perform the PGG under just the conditions described, the allocations made by the participants will eventually be matched to real participants. Thus, no deception was used in this design, apart from the claim that the Dot Estimation task was indicative of psychological tendencies.



intergroup relationships and the tendency to identify with social groups. They were then paid for their participation and individually led out of the laboratory.

### *Analysis*

Once again, the analysis of results will go through several stages, beginning with a test of the significance of mean allocations to minority and majority targets, and moving on to a general linear model testing our central hypothesis. Next, we will examine the size of the bias, relating it to predictions of different target's behaviour in the Public Goods game. The size of the bias for minority as opposed to majority members will be compared to 0 in a T test to ascertain whether the majority's or minority's bias crossed the threshold of significance. Finally, the size of the bias will be related to predictions of contributions to the common resource, and to levels of identification using regression and partial correlation analyses.

### **Results**

On average, minority targets received  $M(97) = 1.71 (SD = 0.92)$ , whereas majority targets received  $M(97) = 1.83 (SD = 0.94)$  GBP. The difference was marginally significant ( $t(96) = -1.9, p = .06$ ). Once again, women were overall more generous to both minority ( $M(48) = 1.76, SD = 0.92$ ) and majority targets ( $M(48) = 1.9, SD = 0.88$ ) than men (to minority,  $M(49) = 1.66, SD = 0.92$ ; to majority,  $M(49) = 1.75, SD = 1$ ). Unlike in Study 1, the difference did not reach significance for either minority or majority targets.

The within subject effect of MMP on allocations to minority and majority was replicated ( $F(1, 93) = 7.81, p = .006; \eta^2 = .09$ ) with marginal significance. We found no effect of gender ( $F(1,93) = 0.24, p = 0.62$ ), or an interaction between MMP and sex ( $F(1,93) = 0.14, p = 0.71$ ). We found no significant main effects of MMP ( $F(1,93) = 2.22, p = 0.14$ ), or sex

( $F(1,93) = 0.44, p = 0.51$ ). A pairwise comparison of allocations to minority or majority targets, by minority or majority participants reveals a significant difference in allocations to the minority (mean difference = 0.44,  $p = 0.02$ ), but not the majority (mean difference = 0.44,  $p = 0.02$ ). This is a reverse from what we had found in Study 1.

Once again, both minority and majority allocators exhibited a bias. It was smaller in the case of the minority ( $M(44) = 0.07, SD = 0.59$ ) than the majority ( $M(53) = 0.27, SD = 0.58$ ), a difference which was marginally significant ( $t(95) = -1.7, p = .09$ ). In a replication of our previous results, the size of the bias was significantly larger than 0 in the case of majority allocators ( $t(52) = 3.39, p = .001$ ), but not in the case of minority allocators ( $t(43) = 0.73, p = 0.46$ ).

The majority expected higher overall levels of contribution in the PGG ( $M(53) = 1.21, SD = 0.63$ ) and reported higher intended contributions to the common pot ( $M(53) = 1.38, SD = 0.63$ ) than the minority (expected contributions,  $M(44) = 1.17, SD = 0.57$ ; intended contributions,  $M(44) = 1.29, SD = 0.64$ ). Neither difference achieved significance, nor contributed significantly to an explanation of the bias.

Next, we turn our attention to the target-specific predictions of contributions to the PGG. Once again, both minority and majority members exhibited ingroup positive bias in their predictions. Minority participants predicted other minority members would contribute an average of  $M(44) = 1.28, SD = 0.59$ , whereas majority members would contribute an average of  $M(44) = 1.22, SD = 0.59$ . The difference did not reach significance ( $t(43) = 1.13, p = 0.26$ ). However, majority participants predicted other majority members would contribute  $M(53) = 1.31, SD = 0.58$ , and minority members  $M(53) = 1.06, SD = 0.53$ , a difference which was once again significant ( $t(52) = -4.11, p < .001$ ). In a regression analysis model where the dependent variable, bias, is explained by predictions of minority and majority contributions

to the PGG, the model is significant for the majority participants ( $F(2) = 11.55, p < .001$ , Adjusted  $R^2 = .56$ ). However, the same was true for the minority participants as well ( $F(2) = 4.83, p = 0.01$ , Adjusted  $R^2 = .44$ ). Unlike in Study 1, both predictions of minority and majority contributions were significant in explaining the bias.

We performed a partial correlation analysis to get a clearer picture of these determinants of bias. If we control for predicted majority contributions, predicted minority contributions were nevertheless significantly and negatively correlated to levels of bias ( $r = -0.50, p < .001$ ) for majority members. Likewise, in the case of minority members, predicted majority contributions correlated significantly and negatively with expressions of bias ( $r = -0.40, p < .01$ ), even when we control for predicted minority contributions.

Identification with the Green group was significantly higher than identification with the Blue group for minority (average difference = 0.85,  $SD = 1.48$ ;  $t(43) = 3.79, p < .001$ ), and majority members (average difference = 1.04,  $SD = 1.9$ ;  $t(52) = 3.91, p < .001$ ). Thus, we may conclude that our minimal group manipulation was successful. Once again, levels of identification were not significantly correlated to levels of exhibited bias either for majority ( $r = -0.09, p = 0.53$ ) or minority participants ( $r = -0.12, p = 0.42$ ). Likewise, levels of identification were not significantly correlated to predictions of contributions to public goods either for majority (majority targets:  $r = -0.12, p = 0.38$ ; minority targets:  $r = -0.04, p = 0.78$ ), or minority participants (majority targets:  $r = 0.08, p = 0.59$ ; minority targets:  $r = 0.13, p = 0.42$ ). Interestingly, the participants' own intended contributions to the public good were negatively correlated with identification levels. For minority members, this did not reach significance ( $r = -0.08, p = 0.59$ ). However, for majority members, the correlation was significant ( $r = -0.37, p = 0.03$ ), meaning the more majority members identified with the

superordinate group, the less willing they were to contribute to the management of group resource.

Finally, we addressed the issue of relative identification with the superordinate identity. Since feedback about relative group size was presented alongside the membership in the superordinate ingroup (Green group), we could capture any difference in the subsequent levels of identification expressed by minority and majority participants. We found that majority participants expressed a significantly higher level of identification with the superordinate Green group ( $M(53) = 6.18$ ,  $SD = 1.79$ ) than the minority ( $M(44) = 5.29$ ,  $SD = 1.61$ ;  $t(95) = -2.53$ ,  $p = .01$ ). Interestingly, the same was true for identification with the Blue outgroup, with the difference achieving marginal significance (for majority,  $M(53) = 5.14$ ,  $SD = 1.97$ ; for minority,  $M(44) = 4.45$ ,  $SD = 1.54$ ;  $t(95) = -1.90$ ,  $p = 0.06$ ). Again, since we did not record levels of identification with the minority or majority respectively, these results do not contradict previous research - instead, they provide complementary evidence which needs to be discussed.

### Discussion

In our second study, the majority once again exhibited a priori negative bias more frequently and more severely than the minority, in line with our predictions and in opposition to predictions made by SIT or BGR. In fact, minority participants did not significantly differentiate between ingroup and outgroup members neither in the allocations, nor in their predictions of targets' contributions to the common pot. However, this time the size of the bias was explained by predicted contributions of the ingroup and outgroup in the case of both the minority and the majority. This leads us to believe that the a priori negative bias we have observed here is possibly framed as a preventive measure to discourage defection, in which any player, regardless of their minority or majority

membership, with long-term self-interest might engage. The fact that predicted contributions to the PGG explain the bias better in the majority case, may reflect the majority assumption of more minority defection than the other way around.

At the same time, we found no indication that the minority truly intends to defect on the contributions to the PGG in relation to the majority. While this seems to contradict our premises at first glance, this is not so. As we have already argued, it is enough for the majority to believe that minority members will take advantage of the common resource. This belief may never be true, or it may only be true under some conditions. For example, we may argue that minorities had no incentive to defect on the common resource management dilemma because their network of exchange (which we may expect to be relatively denser, smaller and more bounded than that of the majority) is not in operation. Thus, if a default strategy supporting minority freeriding exists, we may expect it only when minority members stand to gain through generalized reciprocity, or reputation. Additionally, for the minority, a repeated PGG should present a greater temptation to defect than a one-shot PGG, such as we had used in this experiment. Likewise, a repeated PGG should pose an even greater threat to the majority, causing a more severe bias.

The differential level of identification with the superordinate identity is an interesting echo of real-life findings in which minority members dissociate from the larger group (Branscombe, Schmitt, & Harvey, 1999; Steele, 1997) and endorse multiculturalism at the expense of assimilation (Lambert & Taylor, 1990; Verkuyten, 2005). For such an observation to be made in minimal group situations may indicate fundamentally held beliefs about “minority” and “majority” as categories. As part of a pretest for Study 1 (N = 19; see Supplementary Materials for details), we collected data on the perception of minority and majority identities. In it, participants assigned a minority membership

expressed feelings of confidence and entitlement, but also unease. Participants assigned the majority membership expressed positive feelings of safety and confidence, but also reported that their group membership lacked distinctiveness (“lost in the crowd”). These findings are in line with Brewer’s Optimal Distinctiveness Theory (1991), which postulates a conflict between inclusiveness and distinctiveness of different identities. While satisfied with the level of visibility, minority members did not identify as strongly with the superordinate identity, and reported unease. Conversely, majority membership satisfied the need for inclusion, but, in comparison to the minority, did not achieve a satisfying level of distinctiveness.

### **General Discussion**

The current study shows that activating the consciousness of common resource dilemmas may cause outgroup hate, here defined as deliberate difference maximization, directed at the salient minority. The degree of this hate is at least partially due to the assumption majority members have that minorities will freeride on the common good. If we consider the findings from previous research, which have recorded greater levels of intergroup bias from the side of the minority, we may give a different slant to our results. While consciousness of the common resource dilemma may initiate outgroup negative bias from the majority, it can be said to suspend the bias in the case of the minority. This finding, if valid, carries an interesting implication for peace-making efforts and the impact of media representations of conflict, particularly when it comes to cooperation and integration of heterogeneous communities—the effect of stressing mutual interdependence may have a positive effect on minority members’ relationship to the majority, but a negative one on majority members’ relationship to the minority.

Additionally, our findings challenge the truism that superordinate goals mean a greater degree of intergroup cooperation (Sheriff, 1966). Part of the reason for that may be that, to the best of our knowledge, previous research on the impact of superordinate goals on intergroup bias have used restricted cooperative tasks which did not engender a salient enough social dilemma, and thus did not rely on trust. Rather, our results support Brewer's (1999) proposal that the lack of depersonalized mutual trust which usually exists within ingroups is put into stark contrast in cooperative tasks between groups, breeding more hostility instead of peace. This research begs the question if the group-level interdependence is not confounded by relative group size, i.e. when the social dilemma is being played by two groups of equal size, how will that impact intergroup bias? It seems to us more than a throw away question. Ostensibly, the psychological impact group-level interdependence has on human decision making may have an underpinning in evolutionary and cultural history, going back at least to Pleistocene communities.

Finally, we will address the limitations of the study. Firstly, we find that the majority of participants in both Study 1 and Study 2 often did not allocate the full amount (EUR 5 or GBP 3, respectively) to ingroup targets. In Study 1, we assumed this was the result of the participants being unwilling to allocate the full amount to recipients since they would then make more money than the participant (EUR 5 + EUR 6, in case of All-C, for the recipients v. EUR 10 for the participants). Thus, in Study 2, we reduced the initial endowment for the recipients to GBP 2, and the maximum allocation to GBP 3. This means that in the case of All-C, recipients could make a maximum of GBP 7, while the supervisors would be paid GBP 7.5 Nevertheless, most participants did not allocate the full amount, not even to ingroup members (Study 1, 72%; Study 2, 77.3%). We have no explanation for this finding.

A possible criticism of our design is the fact that we had explicitly named the participants “supervisor”, which puts them in a position of relative power to the “recipients”. According to contact hypothesis (Allport, 1954, 1958), status differentiation prevents reduction in intergroup hostility, and may in fact promote it (Gaertner & Dovidio, 2005; Sachdev & Bourhis, 1991). While we agree that this could have played a role in the level of discrimination, it cannot account for the asymmetry we have found. In addition, Allport’s caveat that differential status may promote rather than prevent intergroup bias was framed as a differential status of the groups, not of individual decision-makers.

In conclusion, our research suggests that the consciousness of common resource dilemmas should be considered as a contributor to intergroup bias. Importantly, the impact it has on behaviours towards the outgroup is moderated by relative group size in such a way that it promotes outgroup hate for the majority, but reduced it in the case of the minority. Several questions have remained unanswered, and are left for future research to tackle. Obviously, we are interested in the external validity of our findings. If true, then minorities should express more positive attitudes towards the majority if they are aware and invested in the management of common resources. Conversely, majority members would express more negative attitudes if they are aware and invested in common resource management.

This research also begs the fundamental question of whether the minorities are more likely to take advantage of the common resource, and under which conditions would this be true, if ever. We hypothesize that, if minority defection is indeed more frequent, it would only be so given (a) no institutionalized method of monitoring, (b) no institutionalized method of punishment (unless it is within rather than between groups), and (c) interpersonal interdependence is in place in some fashion.





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## Chapter 4.

### Common Resource Management Dilemma Breeds Outgroup Hate?

#### An Exploratory Study

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[osf.io/y5k4h](https://osf.io/y5k4h)



## **Abstract**

In this exploratory work, I begin the investigation of intergroup bias in the face of a core proposed characteristic of human groups – the common resource management dilemma. In two studies using a student, and then a non-student sample (N=87 and N=153, respectively), I find indications that consciousness of this ongoing dilemma may cause “outgroup hate”. Even those individuals who had no link to the fate of their group, purposefully maximized the difference between ingroup and outgroup members in a form of a priori negative bias. As a next step, I use the same experimental paradigm to test the impact of common resource management as a superordinate goal shared between groups, on intergroup bias. Unlike previous research suggests, common resource management between groups (a type of a superordinate goal) does not seem to promote peaceable intergroup relations, but likewise promoted outgroup hate. While the scope of my conclusions is limited by a failure to reproduce results from previous literature in the control condition (Study 2), the results indicate activating the consciousness of group-level interdependence leads to outgroup hate irrespective of whether the interdependence includes or excludes the outgroup. I discuss these findings from an evolutionary perspective.

Keywords: Structural Goal/Expectation theory, outgroup hate, intergroup bias, public goods game

## Introduction

Intergroup behaviour continues to pose a theoretical as well as a real-life conundrum to social science generally and psychology in particular. Research has made it painfully obvious that intergroup behaviours are marked by avoidance, discrimination, and even aggression directed at the outgroup (Brewer, 1979, 1999; Hewstone, Rubin, & Willis, 2002; LeVine & Campbell, 1971; Mullen, Brown, & Smith, 1992; Turner, 1981; Wit & Wilke, 1992). This phenomenon is pervasive across human societies (Brewer & Campbell, 1976; Falk, Heine, & Takemura, 2014; Yamagishi, Hashimoto, & Schug, 2008), levels of magnification (Atran, 2003; Van Vugt, 2009), as well as time (Bowles, 2009; Keeley, 1996; Pinker, 2011) and even species (Goodall, 1986; Mahajan et al., 2011; Manson & Wrangham, 1991; Wrangham & Peterson, 1996). In the face of such findings, we are justified in assuming intergroup behaviour, including outgroup negativity, has a basis in evolutionary psychology (Choi & Bowles, 2007; Eibl-Eibesfeldt, 1974; Kurzban & Leary, 2001; Neuberg, Smith & Asher, 2000; Schaller & Neuberg, 2008; Schaller, Park & Faulkner, 2003; Richerson & Boyd, 2005; Van Vugt & Park, 2010), and thus in the structural characteristics of human societies and interactions.

Initially, this (mis)treatment of outgroups seemed inextricably tied to ingroup positivity. Indeed, in one of the first modern works on intergroup bias (referred to as ethnocentrism), Sumner (1906) proposed that the two were one and the same. Thus, positive emotions associated with members of one's own group are proportional to negative emotions associated with outgroup members. He further argued that without such pressures as resource scarcity and intergroup competition, neither ingroup love nor outgroup hate could be activated. While his socio-functional approach to intergroup

behaviour was not yet infused with evolutionary psychological thinking, the argument was clear – we cannot effectively love our own without hating the other.

It is, at this stage, impossible to say whether the period during which our typically human psychological mechanisms for dealing with intergroup situations developed was marked by frequent adversity and organized intergroup conflict (the Hobbesian state of “warre”; Keeley, 1996; Pinker, 2011), or by more isolated, less dense bands of relatively peaceful groups who had little contact with each other (a more refined model of the Rousseauite “noble savage”; Ferguson, 1997). However, what is increasingly clear is that, while some costly forms of ingroup-directed altruism may have developed in the face of intergroup conflict (Choi & Bowles, 2007; Bowles, 2009), the psychological mechanisms supporting ingroup love are separate from outgroup hate.

For all its supposed prevalence in real life, outgroup hate, here defined as deliberate difference maximization between ingroup and outgroup outcomes in a way which does not absolutely benefit the ingroup, has been notoriously difficult to elicit in the laboratory. For example, if the paradigm of the interaction between groups is not framed as a zero-sum game, meaning that participants are able to favour the ingroup without directly damaging the outgroup, the negative bias disappears (Balliet, Wu, & DeDreu, 2014). Participants asked to distribute a negative (instead of the more commonly used positive) resource, have likewise shown no significant intergroup bias (Mummendey et al., 1992). Finally, given the choice between contributing to the ingroup, or contributing to the ingroup while at the same time damaging the outgroup (i.e. maximizing the difference), participants overwhelmingly opted for the former (Halevy, Bornstein, & Sagiv, 2008; Weisel & Böhm, 2015).

In 1999, Brewer argued that ingroup positivity and outgroup negativity should be conceptually separated. She suggested a mechanism she called “bounded social cooperation”

(Brewer, 1999, p.434) to explain preferential treatment of ingroups without the need for a hostile outgroup as a categorical referent or potential competition over resources. Brewer summarizes her argument in three propositions:

1. **Humans are group-living creatures for whom positive interaction with conspecifics is a fundamental survival strategy.** In other words, we are, as a species, characterized by "obligatory interdependence" (Brewer, 1991; Brewer & Caporael, 2006; Caporael, 1997). Again, this is not a finding limited to the Homo but other primate species as well (Dunbar, 1992).

2. **Altruism (or, at least, preferences for mutually beneficial outcomes) must be contingent on the probability that interaction partners will be likewise predisposed to cooperation.** Accurately predicting the likelihood of an interaction partner cooperating comes under powerful selective pressures, springing into life adaptations such as cheater detection (Cosmides, 1989), or Machiavellian intelligence (Byrne, 1995). At the same time, it is clear that conditional cooperation can benefit the individual more so than unconditional cooperation, depending on the situation. Indeed, experiments using economic games have found a consistent and strong positive correlation between player's actions and their predictions of other's actions (Kollock, 1988; Pruitt & Kimmel, 1977; Yamagishi, 1986; Yamagishi & Kiyonari, 2000; Yamagishi & Sato, 1986). While there is criticism that this finding is the result of players' projecting their own behaviour onto others (Dawes, 1980), evidence from sequential (rather than simultaneous) Prisoner's Dilemma games show that people will amend their behaviour to respond to the first player's choices (Hayashi, Ostrom, Walker, & Yamagishi, 1998; Watabe, Terai, Hayashi, & Yamagishi, 1996). Thus, others' intent to cooperate is more often than not met with cooperation, while their defection is met likewise with defection.

**3. Groups can be defined as bounded communities of mutual trust and obligation that delimit obligatory structural interdependence between group members.** Brewer argues that group membership carries with it a depersonalized trust of ingroup members, indicating that cooperation with them is always possible, and in fact the default strategy. As she puts it, “Ingroup membership is a form of contingent altruism” (Brewer, 1999, p 431). In this way, group members can reduce the cost and risk of non-reciprocation, and benefit from this bounded network of exchange (see also Karp, Jin, Yamagishi, & Shinotsuka, 1993; Insko, Schopler & Sedikides, 1998; Tomasello et al., 2012).

The same year as Brewer’s argument for the separation of ingroup love and outgroup hate, Yamagishi and colleagues formulated the Bounded Generalized Exchange approach (BGR; Yamagishi, Jin, & Kiyonari, 1999; Kiyonari, Tanida, & Yamagishi, 2000; Yamagishi & Mifune, 2009; see also Yamagishi, 2007) which expressed a remarkably similar view in even more depth. The key to both explanations is a systematic and reliable network of bounded generalized exchange which exists between group members, and is assumed to work even in minimal group situation (Yamagishi, 2007). Through the interpersonal network of generalized reciprocity (both positive and negative), mutual monitoring, and information exchange (particularly about other actors’ reputations), each individual shares the benefits of group membership, and is invested in maintaining it. Positive treatment of ingroup members, with whom one is more likely to interact repeatedly, is a sound strategy across situations, and thus an error management strategy (Haselton & Buss, 2000). On the other hand, interactions with outgroup members are likely to be restricted. Both of these assumptions can be subverted. For example, Rabbie, Schot and Visser (1989) showed that if the participants are functionally interdependent with the

outgroup rather than the ingroup, the bias they exhibit is likewise switched to favour the outgroup at the expense of the ingroup.

Therefore, we can expect outgroup hate under specific circumstances when it is inexorably connected to ingroup love. This can only be if there is functional interdependence in place, so that the individual can invest into their relative standing with other group members. Some of the mechanisms shown to be crucial to eliciting both ingroup love and, by extension, outgroup hate, are opportunities for reputation management (Foddy, Platow, & Yamagishi, 2009; Mifune, Hashimoto & Yamagishi, 2009; Mifune & Yamagishi, 2015; Platow, Foddy, Yamagishi, Lim, & Chow, 2012; Yamagishi & Mifune, 2008; Yamagishi, Hashimoto, & Schug, 2008), and expectations of future reciprocity by ingroup members (Gaertner & Insko, 2000; Karp, Jin, Yamagishi, & Shinotsuka, 1993; Rabbie, Schot & Visser, 1989; Yamagishi, Jin, & Kiyonari, 1999). For example, using a general sample of Japanese participants, Mifune and Yamagishi (2015) found ingroup favouritism in the Prisoner's Dilemma game only when both decision-makers knew each other's minimal group membership (common knowledge condition). In the unilateral knowledge condition, the players showed no significant intergroup bias, meaning that social identity in and of itself is not enough to elicit intergroup bias (Brewer, 1999) – the identity category must be public and meaningful. The results showed that the predictions of cooperation for each condition, mirrored actual behaviour, with people expecting more cooperation from ingroup members only in the common knowledge condition. The bias shown in the common knowledge condition (but not the unilateral knowledge condition) was strongly correlated with fear of negative evaluation (Watson & Friend, 1969; Leary, 1983), further supporting the reputation management hypothesis.

Combined, Brewer and Yamagishi's work all but dispelled the idea that outgroup hate exists as a necessary outcrop of ingroup favouritism, or a standalone phenomenon removed from the immediate concerns for ingroup outcomes. Instead, it requires ingroup-bounded interdependence to be in operation, so that participants can expect groups to behave the way they do in real life, i.e. containing a network of generalized exchange.

However, I identify here an additional variable which should have existed among natural groups throughout human history, but which has been neglected as a contributor to intergroup bias. In this study, I will explore the impact of common resource management on intergroup behaviour, and outgroup negative bias in particular. My contention is that common resource management involves a different type of interdependence than the one described by Yamagishi and Brewer. In it, each individual is dependent on a common resource being managed by the group as a whole. Unlike interpersonal interdependence, which requires perception of repeated dyadic interactions, group-level interdependence requires a meta-cognition of the group as a whole, and one's reliance on the resources provided through and impacted by group members' actions.

### **Group-level Interdependence and Its Impact on Intergroup Bias**

I define group-level interdependence as the impact other's choices have on the common resource the individual shares with them. The common resource I speak of in this case is one which is generated, maintained, and redistributed by the group members themselves (such as hunted meat, fire, or constructed shelter). This distinguishes it from plentiful natural resources which required little human agency before they could be exploited, or resources which were exploited by individuals without the need for group coordination (such as water, fruit, scavenged meat, or natural shelter).

Resources which require human coordinated agency for exploitation are subject to the n-person social dilemma. As such they are characterized by a conflict of long-term and short-term selfish incentives. Each individual has the vested interest to benefit from the common resource without contributing to it. Simultaneously, if all individuals behave in a short-term self-interested way, the common resource will eventually collapse, and all the participants will suffer as a result. Thus, common resource management dilemmas incorporate a “conflict between individual and collective rationality” (Parks, Henager, & Scamahorn, 1996, p.135).

Martin Wolf, writing for the Financial Times (2012) noted that “The history of civilization is a history of public goods”. It seems a simple enough statement to suggest that the complexity of human social systems coincided with, or were even driven by, the need to manage common resources between group members. However, at the time of writing, the author is not aware of any work which would shed light on the evolution of common resource management strategies, or even a recognition of when human (or pre-human) communities began to engage in complex, dilemma-prone resource management. Nevertheless, there seems to be a consensus that common resource management was a staple evolutionary conundrum which all human populations had to solve (Dunbar, 1999; Olson, 1965; Parks, Joireman, & Van Lange, 2013).

A possible origin of common resource management comes with the emergence of hunting. Thieme (1977) found the first irrefutable evidence of hunting in *Homo Erectus*, living between 500,000 and 400,000 years ago in the Schöningen and Boxgrove regions. Other anthropologists have suggested that this marks a division of labour, particularly on gender lines (Knight, 1991; Knight et al., 1995; Power & Watts, 1996), into mostly male hunters and mostly female gatherers. This coincides with the finding that early *Homo*



transported meat to a central location or a “campsite” (Isaac, 1978; Deacon, 1997), where it was shared. This tendency became more and more prevalent. Even in the very recent evolutionary past, we can see very little archaeological evidence of symbolic artefacts or food transport in the Neanderthal, compared to Homo Sapiens from the same time (Steele & Shennan, 1996).

The sharing of meat is observed across human hunter-gatherer societies (e.g., Cashdan, 1989; Kaplan & Hill, 1985; Kaplan, Gurven, Hill, & Hurtado, 1990; Woodburn, 1982), and even in non-human primates such as chimps, bonobo, and capuchin monkeys (see de Waal, 1996, 2005 for an overview). This has occurred frequently enough to have caused a social sharing norm in chimpanzees (de Waal, 1989), as well as humans (Gurven, 2004; Gurven, Hill, & Kaplan, 2002; Kameda, Takezawa, Tindale, & Smith, 2002, Smith & Bliege Bird, 2000). Hawkes and colleagues (Hawkes et al., 1993) argued that widely shared resources of this kind can be functionally equivalent to a public goods dilemma.

All of this necessarily means that ingroup members became increasingly specialized in their food acquisition skills, yet partook in the eating of all of it. Kameda, Takezawa and Hastie (2003) surmise that this presents an unsolved dilemma situation where individuals would be better off if they did not participate in the acquisition of the resources, but do participate in their consumption.

If it is the case that common resource management dilemmas have occurred reliably during the course of evolutionary history (Caporael, 1994) and carried a high potential cost of failure (Hasleton & Buss, 2000), we might expect the formation of default behavioural strategies, and psychological systems to support their implementation. Indeed, the intense automaticity (Bargh & Chartrand, 1999; Zaki & Mitchell, 2013) and prevalence of human

prosociality (Henrich et al., 2005; Warneken & Tomasello, 2009) may in part be the result of the need to solve the common resource dilemma.

In this exploratory study, I ask two separate but related questions. Firstly, how does activating awareness of the ingroup-bounded common resource management dilemma impact intergroup behaviour, particularly outgroup hate? Secondly, how does extending the dilemma across group borders impact the intergroup behaviour?

The predictions we can make for these two questions run in opposites. I will discuss them briefly. Classical Social Identity theory would predict bias, irrespective of the circumstances. Thus, whether the group is involved in common resource management with another group, or independent of it, should exert no impact. The intergroup bias should be present, and the variability in it accounted for by the level of identification. On the other hand, the Bounded Generalized Reciprocity approach would predict that as long as the individual has no vested interest in maintaining their reputation within a network of interpersonal exchanges associated with the ingroup, they should not make the distinction between ingroup and outgroup outcomes. Structural Goal/Expectation theory (Pruitt & Kimmel, 1977; Yamagishi, 1986) would suggest that intergroup bias will occur if the participants perceive the situation to engender a dilemma which cannot be solved across group borders, i.e. without the co-existence of a reliable network of interpersonal exchange which can be assumed to work reliably, based on Brewer's system of depersonalized trust. Thus, we would expect that intergroup bias will be explained by the perception that a dilemma exists in the common resource management situation, and by the predicted contributions to the common good.

### **Study 1**

The purpose of Study 1 was to investigate the impact of introducing consciousness of group-level interdependence on intergroup bias, more particularly, outgroup hate. Participants who have been assigned a minimal group membership were told other ingroup members were involved in a Public Goods game (PGG) with each other. They had no information about the activities of the outgroup. The participants could allocate money to two ingroup<sup>16</sup>, and one outgroup target. The maximum a participant could allocate to any recipient was EUR 5. Anything under EUR 5 could be interpreted as a deliberate detraction from the best case scenario for that recipient. Conversely, any difference in allocations to targets can be interpreted as deliberate difference maximization, i.e. an a priori negative bias.

For performing this task, they were paid a fixed sum of EUR 10. Thus, each participant performed three non-zero-sum allocations to different targets. They were not able to keep any of the money for themselves, eliminating own-outcome maximization as a motive for behaviour in the experiment. In addition, the participants were told they were the only ones performing the allocations. Thus, the bounded generalized system of reciprocity operating within the group (Yamagishi, Jin, & Kiyonari, 1999) was discontinued. According to previous research, this explicit removal of any opportunity for management of social capital (through reciprocity or reputation) should reduce intergroup bias to non-significance. Thus, any intergroup bias observed should be a reaction to the knowledge of common resource management within the group or the result of the individual's levels of social identification, and not an effect expectations of future reciprocity or reputation concerns.

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<sup>16</sup> Study 1 corresponds to Study 1 from Chapter 3. The participants were assigned group membership in the Green group, as well as membership in the minority (20%) or majority (80%) within that group. The Blue group, the outgroup, was only inferred by participants.

A G\*power calculation for at medium effect size  $f=0.25$  indicated a necessary sample size of at least  $n = 86$  (Cohen, 1977) for the purposes of the original design. The calculation was performed using a G\*power calculator (Faul & Erdfelder, 2004).

## **Method**

### ***Participants***

Eighty-seven participants (43 female) were recruited at Jacobs University, an international, English-language university situated in Bremen, Germany. The experiment was conducted on campus, in the Social and Behavioural Laboratory. Participants were on average twenty years of age, of mixed cultural, ethnic and national backgrounds. Germans were the largest national group at 16.05%,  $N=13$ .

### ***Procedure***

Participants were invited to the lab in groups of up to ten. They were welcomed by a female experimental assistant. The participants randomly selected an ID number, and were led into individual computer booths. Once all the participants arrived, they were told to input their ID numbers and sex into the computer, whereupon the experiment could begin.

### ***Minimal group categorizations***

The first portion of the experiment dealt with the creation of two types of group categories. Two separate tasks divided the participants first into a Blue and Green group, and subsequently into a minority and majority within the group<sup>17</sup>. The tasks were

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<sup>17</sup> This minority / majority distinction was meaningless for the research questions in this paper. The impact of having been categorized as minority or majority members is treated as a confounding variable and controlled for in the analysis. For a more detailed discussion of the experimental procedure, please view Supplementary Materials.

presented as tests of perception which have been shown to carry certain behavioural implications, thus potentially loading them with meaning.

In reality, all participants were assigned membership in the Green group, as either minority or majority members. The Blue group was only implied. The categorization into minority or majority Green-group members was determined by the order of registration at the beginning of the study.

Feedback about group membership was permanently displayed in a header for the remainder of the experiment. After the initial categorization into Blue and Green group, the participants were given a questionnaire (adapted from Grieve & Hogg, 1999) to determine their degree of identification with the minimal groups. During this time, the experimental assistant distributed green and blue flags. She asked the participants to indicate their group membership before handing them the appropriate flag. No participant identified themselves as a member of the Blue group.

### *Individual outcome independence*

After categorization into minority and majority Green group members (MIN and MAJ conditions), the assistant presented the participants with a gambling task. Participants were asked to choose a folder which contained a code supposedly determining the tasks they would be asked to perform in the study. In fact, all participants received the same code. The purpose of this step was to 1) eliminate the possibility of indirect reciprocity between group members, and 2) to introduce the Public Goods game as a credible interaction with real consequences.

Once the participants entered the code into the computer, they were given the instructions to the rest of the experiment. Firstly, they were informed that their reward is

fixed at EUR 10, and will not be affected by their decisions, or the decisions of other participants

### *Group-level Interdependence Manipulation*

Next, the participants were told they would be taking part in a Supervision task. More precisely, they would supervise a “Public Exchange task” in which the remaining participants (hereafter referred to as recipients) in their group would take part. They were given no information as to what members of the Blue group would be doing.

The Public Exchange task was modelled on the Public Goods game (PGG, Ledyard, 1995). The recipients were supposedly given EUR 3 by the experimenters, which they could choose to contribute to a common pot in increments of 10 cents. Whatever they did not contribute would be theirs to keep. Contributions from all recipients would be summed up, doubled, and then redistributed equally. It was made clear to the participants that this meant those recipients who did not contribute to the common pot could profit from their freeriding.

Participants were given a short test of their understanding of the PGG, as well as two questions pertaining to their predictions about 1) average contributions to the common pot by Green group members, and 2) their own intended contributions to the common pot, if they were taking part in the PGG. Thereafter, they were familiarized with the details of the Supervision task they would be performing. They were shown a decision-making interface which would enable them to allocate up to EUR 5 to three randomly chosen recipients. The participants could allocate a minimum of EUR 0.1 and a maximum of EUR 5 to each recipient, in increments of 10 cents. This money would supposedly be added to the recipients’ winnings from the PGG. The participants were not able to keep any part of the endowment for themselves.

After the participants read the instructions and interacted with the decision-making interface, they were presented with three dummy recipients: one from the Green group minority, one from the Green group majority, and one from the Blue group. After they completed all three allocations, the participants were asked to estimate the recipients' trustworthiness and their tendency for prosocial behaviour. In addition, they were asked to predict how much each recipient would contribute in the PGG, and how much each recipient would give to the supervisor if the roles were reversed.

### *Analysis*

The first step in the analysis will be to ascertain whether a significant difference exists in the absolute donations to ingroup (Green group) versus outgroup (Blue group) targets, thus giving us an answer to the central question of how consciousness of a common resource management dilemma within the ingroup impacts intergroup bias. Next, the allocations to the ingroup and outgroup are treated as within-subjects variables, and entered into a general linear model as outcomes. The predictors will be the two between-subjects variables, sex and membership in the minority or the majority. Rather than explanatory variables, both of these are treated as possible confounders.

Next, the size of the bias will be calculated by subtracting the allocations to the outgroup (Blue group) from the allocations to the ingroup (Green group). However, since in this study the ingroup itself contained a minority and a majority, I will consider the allocations to the targets most closely resembling the participant as the allocations to the ingroup. Thus, the allocations to the Green group minority will be taken as a measure of ingroup allocations if the participant was initially classified as a minority member. The size of the bias will be related to measurements of social identification with the Green group, and the predicted donations to the common resource by ingroup rather than outgroup

members. These predictions will once again follow the scheme as the allocations – predictions about those targets most closely resembling the participants themselves will be considered predictions about ingroup behaviour. These two variables (levels of social identification and predictions about outgroup contributions to the common good) will be tested for their contribution to explaining the size of the intergroup bias using a linear regression analysis.

### Results

On average, participants contributed  $M = 3.64$  ( $SD = 1.45$ ) to the ingroup<sup>18</sup>, and  $M = 3.01$  ( $SD = 1.78$ ) to the outgroup. This difference was highly significant ( $F(1,83) = 24.93$ ,  $p < .001$ ; Partial  $\eta^2 = 0.23$ ). A general linear model analysis has revealed no impact of membership in the minority or majority (MMP;  $F(1,83) = 0.18$ ,  $p = 0.67$ ), sex, ( $F(1,83) = 0.23$ ,  $p = 0.63$ ), or an interaction of the two ( $F(1,83) = 2.64$ ,  $p = 0.11$ ). Likewise, there were no main effects of MMP ( $F(1,83) = 2.37$ ,  $p = 0.13$ ) or sex ( $F(1,83) = 2.15$ ,  $p = 0.15$ ) on allocations to the ingroup and outgroup.

To operationalize the size of the bias, I subtracted the allocations to the outgroup from the allocations to the ingroup. On average, participants maximized the difference between their own group, and the outgroup ( $M(87) = 0.63$ ,  $SD = 1.20$ ) to a degree which is significantly larger than zero ( $t(86) = 4.88$ ,  $p < .001$ ). The size of the bias was slightly smaller for minority ( $M(43) = 0.58$ ,  $SD = 1.13$ ) than it was for the majority ( $M(44) = 0.68$ ,  $SD = 1.29$ ), but the difference did not achieve significance ( $t(85) = -0.37$ ,  $p = 0.71$ ). The size of the bias was not explained by predictions of outgroup targets' contributions to the (outgroup) common pot ( $F(1,78) = 0.008$ , n.s.).

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<sup>18</sup> Ingroup allocations here signify the amount given to the targets most similar to the individual participants. In other words, it is the allocation majority members made to majority targets, and those minority members made to minority targets.



Next, I turn my attention to the level of identification with the minimal groups. On average, participants identified more strongly with the Green ( $M(85) = 4.59$ ,  $SD = 1.13$ ) rather than the Blue group ( $M(85) = 4.3$ ,  $SD = 1.3$ ;  $t(84) = 2.66$ ,  $p < .01$ ), indicating that the minimal group manipulation was successful. According to social identity theory, we would expect that high identifiers behave in a more parochial way, exhibiting more ingroup preference and outgroup derogation. Within the confines of this study, we would expect high identifiers to maximize the difference more severely than low identifiers. For this purpose, participants were grouped into those whose level of identification with the Green group was higher than the mean, and those whose identification scores were lower than the mean. Since Simunovic, Boehnke & Wilhelm (in preparation; Chapter 3 in this thesis) showed that minority members may identify with the superordinate identity less intensely, MMP was included alongside it into a general linear model to explain differential allocations to the ingroup and outgroup. However, a general linear model revealed no within subject effect of identification levels ( $F(1,81) = 0.1$ , n.s.), MMP ( $F(1,81) = 0.33$ , n.s.), or an interaction of the two ( $F(1,81) = 1.73$ , n.s.). The same was true for between subject effect, which did not reach significance for either MMP ( $F(1,81) = 1.35$ , n.s.), levels of identification ( $F(1,81) = 0.59$ , n.s.), or their interaction ( $F(1,81) = 1.64$ , n.s.). Furthermore, the size of the bias was not explained by the level of identification with the Green group ( $F(1,83) = 0.25$ , n.s.), or the preference for the Green as opposed to the Blue identity ( $F(1,83) = 0.04$ , n.s.).

Finally, we will consider the predicted contributions to the PGG. Unsurprisingly, participants predicted ingroup members ( $M(80) = 2.12$ ,  $SD = 0.86$ ) would contribute significantly more to the common pot than outgroup members ( $M(80)=1.87$ ,  $SD=0.91$ ;  $t(79) = 2.37$ ,  $p = 0.02$ ). A simple linear regression was calculated to predict the size of the bias

based on predicted contributions of the outgroup to the common pot. No significant regression equation was found ( $F(1,78) = 0.01$ , n.s.). The same was true when the predictor variable is the difference score between predicted contributions by the ingroup and the outgroup ( $F(1,78) = 0.88$ , n.s.). Instead beliefs about the trustworthiness of outgroup members and their tendency to behave in a prosocial way (identified in the questionnaire as the tendency to follow rules, help group members and sacrifice for the good of the group) provided a better explanation of the size of the bias ( $F(2,77) = 10.49$ ,  $p < .001$ , with an Adjusted  $R^2 = .21$ ). In other words, the beliefs that outgroup members are likely to behave in a selfish way accounted for the size of the bias.

### Discussion

Participants who were conscious of a common resource dilemma occurring within their ingroup exhibited a priori negative bias against the unconnected outgroup. This, despite the fact their own rewards were fixed and independent of the others' actions, and the fact that they could not count upon a system of indirect reciprocity to reward their actions. In addition, I found no effect of the level of identification on either the size of the bias, or the tendency to commit it in the first place, as Social Identity Theory (Tajfel, Flament, Billig, & Bundy, 1971) would predict. However, this connection is known to be unstable (Brewer, 1979; Brewer & Campbell, 1976; Hinkle & Brown, 1990; Kosterman & Feshbach, 1989).

Study 1 was not geared exclusively to testing the impact of group-level interdependence on intergroup bias. While I found no direct impact of membership in the minority or majority on allocations to the outgroup, I cannot discount the possibility that the experimental setting skewed responses paradigmatically, as a result of the introduction of embedded groups. In other words, it is possible that implying non-cohesion within the

Green group drove negative bias against the Blue group by default. Thus, a more correct test of my research question should include only a minimal group categorization into Green and Blue groups.

Additionally, the results raised questions. If the consciousness of common resource management truly activates negative intergroup bias as the present results would suggest, what impact does sharing this common resource between groups have?

### **Impact of Superordinate Goals - Intergroup setting**

Seminal research going back to Sherif and colleagues (1966) has shown that introduction of a superordinate goal may reduce intergroup conflict. In the classic Robber's Cave study, groups of 11- and 12-year-old boys who had been feuding for weeks, were faced with a challenge they could only solve by cooperating. Since both groups had a vested interest to overcome the "common predicament" (get the water truck safely to the camp), the two groups entered into a temporary alliance which grew into a reduction of intergroup tension, and even intergroup friendships. Subsequent research has found support for the idea that cooperative interdependence based on superordinate goals reduces outgroup directed negativity (Aronson, Stephan, Sikes, Blaney, & Sapp, 1978; Brewer & Miller, 1984, 1996; Brown & Wade, 1987; Cook, 1984; Deschamps & Brown, 1983; Desforges et al., 1991; Deutsch, 1973; Gaertner, Mann, Dovidio, Murrell, & Pomore, 1990; Johnson, Johnson & Maruyama, 1984; Miller & Davidson-Podgorny, 1987; Rabbie, Benoist, Oosterbaan, & Visser, 1974; Slavin, 1985).

However, to my knowledge, none of these studies have framed intergroup cooperation as a common resource management dilemma. Unlike one-off cooperation tasks usually used to induce intergroup cooperation and a reduction of hostilities, group-level interdependence of the kind I have described here includes a mixed motive incentive

matrix. The mixed motives are not only apparent on the individual, but also on the group level. Consider two groups of equal size who play the Public Goods game together.

A typical Public Goods game (PGG) is an  $n$ -person dilemma in which each participant has the choice of contributing to the common resource from their own endowment. Each participant may then choose how much of their endowment to contribute to the common pot<sup>19</sup>. The contributions are multiplied by a factor  $r$ , meaning that they grow in value for having been assembled. Subsequently, the common pot is redistributed equally to all players. In this way, if all players contribute the maximum to the common pot (All-C), they will all receive their initial endowment multiplied by  $r$ . For each participant individually it is better to contribute nothing while everybody else cooperates fully. In this way, the individuals may accrue the benefit from participating in the PGG without losing any of their initial endowment.

The same is true on a group level. If two groups share the management of common resources whichever group has the most defectors will, on the group level, make a greater profit than the group with more cooperators. This extra profit may be redistributed among other group members, increasing their relative standing. In other words, group-level interdependence carries with it the possibility for difference maximization on the group level. At the same time, any defection reduces the size of the common pot and, therefore, each individual's benefit accrued from participating in the management of the common resource. If this competition continues, the common resource will eventually collapse.

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<sup>19</sup>While the most common experimental paradigms equate the type of resource with the type of endowment, this rarely holds true in real life. In most cases, the resource invested into the common pot (e.g. effort, time, risk) is qualitatively different from the resources expected from the common pot (e.g. big game). Thus it is much more difficult to estimate the relative values of the endowment to the return. The assumption is that the benefit outweighs the cost in most cases, and in the long term. Ergo, the contributions are multiplied by a factor  $r$  to signify this profit.

In fact, evidence from macroeconomics and sociology suggest just that. Rather than promote intergroup peace, group-level interdependence seems to drive defection on the common resource, and even outgroup hate. Alesina and colleagues (Alesina Baqir, & Easterly, 1999; Alesina & LaFerrara, 2000) have consistently found a negative effect of diversity, i.e. the presence of outgroups, on contributions to the common resource. This also holds for the management of an existing resource which tends to be overexploited in more heterogeneous communities (Khwaja, 2002; Montalvo & Reynal-Querol, 2005). Miguel and Gugerty (2005) investigated contributions to public goods in Kenya. They found that ethnic diversity was associated with lowered giving to primary school funds, overall worse school facilities, and even poorer water well maintenance. They put the effects down to the inability of ethnically diverse communities to impose social sanctions and successfully cooperate in the face of uncertainty. This finding goes in line with Brewer's (1999) prediction that superordinate goals may lead to intergroup bias, particularly outgroup hate. She explains it in similar terms – the spill-over of the interdependence structure from the ingroup to include the outgroup does not imply the spill-over of the depersonalized trust. Thus, rather than establish trust, some superordinate goals “make salient the absence of mutual trust” (p.436) and promote intergroup conflict and hostility.

Finally, using world-wide data, Montalvo and Reynal-Querol (2005) found that ethnic and religious polarization has significant negative effects on economic development, due to the reduction of investments, and increased public consumption. They further found that diversity under such conditions contributes to the probability of civil war. Such failure of collective action has been theorized to lead directly to increased discrimination (Hjort, 2013).

However, this does not always seem to be the case. Investigating nested social dilemmas, in which people face the decision between benefitting themselves, their subgroup, or the superordinate group within which the subgroup exists (Wit & Kerr, 2002), has yielded opposite results. Notably, Buchan and colleagues (Buchan et al., 2009) found globalization, what is to say increased interconnectivity and interdependence on people from various groups, is negatively correlated to intergroup bias. This bias was measured by the variability in parochial, and universalist choices in a multilevel Public Goods game. In other words, intergroup bias was conceptualized as preferential giving to a common resource pool reserved for the “local”, subgroup benefit, or the “world”, superordinate group’s benefit. Their results indicated that the higher globalization levels are for the individual as well as their community on the aggregate level, the less intergroup bias in allocations to the common pool will be. While not exactly equivalent to the cases discussed above, where heterogeneity led to a decrease in donations to public goods benefitting the superordinate group, we cannot ignore this discrepancy.

Given that we have found the mere consciousness of ingroup-bounded group-level interdependence caused outgroup hate, we now have two competing hypothesis for what would happen if the group-level interdependence is extended to include the outgroup. Thus, in Study 2 I will address three separate goals:

1. Replication of findings from Study 1
2. A test of two competing hypothesis on the impact of common resource management as a superordinate goal, on outgroup hate
3. Replication of Yamagishi’s findings that, with both interpersonal or group-level interdependence suspended, no intergroup bias should be observed

In addition, and since the participant's intended and predicted donations to the public goods are recorded, we can ask an additional question: Does heterogeneity in the Public Goods game necessarily lower contributions to the common pool? While this research is not designed to answer this question, the data we do have may serve as an indicator of whether the mismatch between group boundaries and group-level interdependence inherently means a loss of common resource. Namely, the intended and predicted donations to the public good will be compared between the Interdependent condition (in which two groups share in the common resource management), and the Matched condition (in which two group match the resourced separately).

## **Study 2**

The purpose of Study 2 was to address the impact of group-level interdependence on intergroup bias between groups of equal size who either share the management of the common resource, or who manage a common resource separately. For this purpose, I introduced three experimental conditions: Interdependent, Matched, and Control. In the Interdependent condition, participants were told the ingroup and outgroup were playing the PGG together. Thus, the management of the common good could here be constructed as a superordinate goal, transcending group boundaries. In the Matched condition, structural interdependence was matched to the identity boundaries, so that the participants were told ingroup and outgroup members were playing the PGG only with other members of their own groups. Thus, the Matched condition was equivalent to the conditions of Study 1, without the categorization into minimal minorities and majorities. Finally, a Control condition was added. In it, the participants were not given any information about what the recipients of their allocations were doing. Since the participants were independent of the ingroup fate, and could not expect opportunities for reputation management, the control

condition was conceived as a replication of Yamagishi's findings (Yamagishi, Jin, & Kiyonari, 1999).

In addition, Study 2 would address some additional short-comings of Study 1, particularly the problems inherent in using a student sample on a small campus, and the extent of the deception used in Study 1. Thus, in Study 2, I used a general population sample, committed to a subsequent study which would utilize the participants' decisions as presented in the experiment, and removed the additional categorization. In an effort to make the results more robust, each supervisor allocated money to three ingroup and three outgroup targets.

An online platform (Prolific Academic; see Peer, Brandimarte, Samat, & Acquisti, 2017, for review of Prolific's sample, response rate, and data quality) was used to recruit a relatively heterogeneous sample (in 2017, 35% female, 56% UK and European nationals, average age of 27).

As in Study 2, the main behavioural measure was a non-zero-sum allocation game in which the participants would be able to give a minimum of GBP 0.1, and a maximum of GBP 3 to each recipient. Anticipating small effect sizes ( $f = 0.15$ ), indicated a necessary sample size of at least  $n = 120$  (Cohen, 1977). The calculation was performed using a G\*power calculator (Faul & Erdfelder, 2004).

## **Method**

### ***Participants***

One hundred and fifty six participants (74 female) were recruited via Academic Prolific, a database of over 50,000 potential participants. Most of these have been recruited while attending a college, meaning that the sample has a higher average education level



than the general population. Average age of the participants was 30. Ages ranged from 18 to 61.

### *Procedure*

Participants were invited to the study via their Academic Prolific accounts. Once they registered, the link to the study was sent to them automatically. Most participants completed the study within the next two or three days.

After they input their Prolific ID and sex, the participants took part in a Dot Estimation task which split them into the Green and the Blue group. This information was permanently displayed at the top of the page. After the minimal group categorization, the participants' level of identification with the Green and Blue groups was ascertained using the same questionnaire as in Study 1.

### *Behavioural Measure*

The participants were told their task was to supervise a "Public Exchange task" which 6 international students (hereafter referred to as recipients) are performing as part of a series of studies hosted by Jacobs University. For their participation, the participants would receive a fixed reward of GBP 7.5<sup>20</sup>. It was made clear to them that neither the experimenters, nor the other participants, nor the supervisor's own actions would impact this amount.

Then, the participants were familiarized with the Public Exchange task<sup>21</sup>, i.e. the PGG. In it, recipients were given GBP 2 by the experimenters, and asked to donate any

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<sup>20</sup>GBP 7.5 is not equivalent to the EUR 10 our student participants received in Study 1. The currency and amount were dictated by Academic Prolific.

<sup>21</sup> Since the author is planning to perform the PGG under just the conditions described, the allocations made by the supervisors will eventually be matched to real participants. Thus, no

portion of that money to a common pot. The sum of all contributions to the common pot would then be doubled and redistributed to all 6 recipients equally. The instructions make it clear that it is in the interest of each person taking part in the PGG to contribute nothing, and reap the benefits of others' contributions.

The participants were given a manipulation check to capture their understanding of the instructions. They were also asked to 1) predict the amount of money most people would contribute to the common pot, 2) indicate how much they themselves would contribute to the common pot if they were taking part in the PGG.

Finally, the participants were familiarized with the decision-making interface and their supervision task. The task consisted of two steps. First, the participants were asked to predict each recipients' contributions to the common pot. Secondly, they were asked to allocate up to GBP 3 to each of the recipients. As in Study 2, they were asked to allocate at least 10 pence to each recipient. The participants could keep none of this money for themselves. After making their decisions, the participants were given a post-experimental questionnaire dealing with their understanding of the supervision task, the conceptualization of intergroup relationships, the tendency to identify with social categories, and their social dominance orientation.

### *Analysis*

Once again, the first step of the analysis will be to check whether allocations to ingroup (Green) as opposed to outgroup (Blue) members showed a significant difference. This will be done across all conditions, and then in a general linear model where the

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deception was used in this design, apart from the claim that the Dot Estimation task was indicative of psychological tendencies.

predictors are between-group factors, condition (Matched, Interdependent, and Control) and sex.

Next, the size of the bias is calculated and related to levels of identification and predicted contributions to the common resource. This latter analysis will be done using a linear regression model, and partial correlation analysis.

Finally, I will address the differences in predicted and intended contributions to the common pool in order to ascertain whether heterogeneity in the face of common resource management dilemma necessarily leads to a loss of the public good. For the purpose, I will use a general linear model in which predictors will once again be condition and sex.

## Results

Overall, participants were more generous towards members of their ingroup ( $M(156) = 1.99$ ,  $SD = 0.93$ ) rather than the outgroup ( $M(156) = 1.7$ ,  $SD = 0.98$ ) across all conditions. This difference was highly statistically significant ( $t(155) = 6.47$ ,  $p < .001$ ). A repeated measures general linear model was conducted which showed no within subject effect of condition ( $F(2,150) = 0.51$ ,  $p = 0.60$ ), sex ( $F(1,150) = 0.06$ ,  $p = 0.82$ ), or an interaction of the two ( $F(2,150) = 1.53$ ,  $p = 0.22$ ). The same analysis showed no between subject effects of condition ( $F(2,150) = 0.11$ ,  $p = 0.90$ ), sex ( $F(1,150) = 1.05$ ,  $p = 0.31$ ), or an interaction between the two ( $F(2,150) = 1.56$ ,  $p = 0.21$ ).

As before, I calculated the size of the bias by subtracting allocations to the outgroup from allocation to the ingroup. The size of the bias was significantly larger than zero across all conditions (in the Interdependent condition,  $t(52) = 3.38$ ,  $p = 0.001$ ; in the Matched condition,  $t(51) = 3.48$ ,  $p = 0.001$ ; in the Control condition,  $t(50) = 4.29$ ,  $p < .001$ ). These results limit the scope of what could be concluded from this experiment. Since the Interdependent and Matched conditions both showed a priori negative bias, it is tempting

to assume this means the mere consciousness of common resource management dilemmas activate negative outgroup bias, irrespective of whether this is occurring within or between groups. However, the same behaviour was observed in the Control condition, against the predictions of BGR.

Instead, I turn my attention to levels of identification as mechanisms promoting negative intergroup bias. On average, participants identified more with the Green group ( $M(156) = 5.84$ ,  $SD = 1.81$ ) than with the Blue group ( $M(156) = 4.84$ ,  $SD = 1.79$ ;  $t(155) = 8.14$ ,  $p < .001$ ), indicating the minimal group manipulation was successful. Levels of identification with the Green group, and the degree of preference for the Green as opposed to the Blue group were used to predict the size of the bias in a linear regression model. The overall model for all conditions was highly significant ( $F(2, 150) = 3.54$ ,  $p = 0.03$ ). However, once this is broken down by condition, the level of identification explains negative outgroup bias only in the Control condition, i.e. when there is no additional information on common resource management occurring within the group ( $F(2,150) = 7.14$ ,  $p < .01$ ). The model was not statistically significant in the Interdependent ( $F(2, 150) = 0.09$ ,  $p = 0.92$ ) or the Matched condition ( $F(2,150) = 0.31$ ,  $p = 0.74$ ).

Table 1. Regression coefficients for Interdependent, and Matched conditions, where expected contributions to the public good by ingroup and outgroup members predict the size of the bias.

Interdependent Condition					
	B	Std. Error	Beta	t	Sig.
(Constant)	.092	.157		.588	.559
predout	-.668	.222	-.799	-3.011	.004
predin	.709	.231	.814	3.071	.003
Matched Condition					
	B	Std. Error	Beta	t	Sig.
(Constant)	.001	.165		.007	.995
predout	-.664	.148	-.716	-4.483	.000
predin	.779	.160	.776	4.856	.000

Instead, the size of the bias in the Interdependent and Matched conditions is best explained by predictions of contributions in the PGG (in the Interdependent condition,  $F(2,150) = 4.95$ ,  $p = 0.01$ ; in the Matched condition,  $F(2,150) = 13.01$ ,  $p < .001$ ). It is noteworthy that both predictions of ingroup contributions, and predictions of outgroup contributions are significant in explaining the bias (Table 1). While the two predictions are highly positively correlated (in the Interdependent condition,  $r(53) = 0.87$ ,  $p < .001$ ; in the Matched condition,  $r(52) = 0.69$ ,  $p < .001$ ), their individual correlation to the size of the bias is far less stable. Predictions of outgroup contributions to the common pot show no significant correlation to the size of the bias in either condition (in the Interdependent condition,  $r(53) = -0.9$ , n.s.; in the Matched condition,  $r(52) = -.18$ , n.s.), while the predictions of ingroup contributions are significantly positively correlated to the size of the bias only in the Matched condition ( $r(52) = 0.28$ ,  $p = 0.04$ ; in the Interdependent condition,  $r(53) = 0.12$ , n.s.). To try and understand this finding, I partially correlated the bias score to predicted outgroup contributions, while controlling for predicted ingroup contributions. In both the Interdependent ( $r = -0.39$ ,  $p = 0.004$ ) and the Matched condition ( $r = -0.54$ ,  $p < .001$ ) the predictions of outgroup contributions were significantly and negatively correlated to the size of the bias even after eliminating their correlation to predictions of ingroup contributions.

In addition, I examined the predicted and intended contributions to the public good in the Interdependent and Matched conditions. First, participants were asked to indicate how much they expected people would contribute to the common pool on average. While participants in the Interdependent condition expected slightly higher overall contributions ( $M(53) = 1.23$ ,  $SD = 0.68$ ) than participants in the Matched condition ( $M(52) = 1.08$ ,  $SD =$

0.69), the difference did not reach significance ( $F(2, 104) = 0.79, p = 0.50$ ). Additionally there was no within-subject effect of condition ( $F(2, 104) = 1.16, p = 0.29$ ), sex ( $F(2, 104) = 1.08, p = 0.30$ ) or an interaction of the two ( $F(2, 104) = 0.07, p = 0.79$ ). Next, participants were asked to indicate how much they intended to contribute to the common pool if they were actually taking part in the PGG. Once again, although the intended contributions were slightly higher in the Interdependent ( $M(53) = 1.44, SD = 0.67$ ) rather than the Matched condition ( $M(52) = 1.22, SD = 0.74$ ), the effect did not reach significance ( $F(2, 104) = 0.81, p = 0.49$ ). Additionally there was no within-subject effect of condition ( $F(2, 104) = 2.32, p = 0.13$ ), sex ( $F(2, 104) = 0.01, p = 0.91$ ) or an interaction of the two ( $F(2, 104) = 0.09, p = 0.77$ ). There seems to be no a priori effect of heterogeneity on contributions to group resources, seeing how our participants reported intending to contribute the same amounts irrespective of whether they were playing the Public Goods game across or within group boundaries.

### **Discussion**

Study 2 succeeded in replicating the findings from Study 1 by showing that individuals who should have no personal investment in the outcomes of their groups show outgroup negative bias if they are made aware of a common resource management dilemma being played within their group (Matched condition). In addition, when the common resource management dilemma is extended beyond group borders to include the outgroup (Interdependent condition), the motivation for difference maximization does not seem to be eliminated. However, the motivation for this bias is unclear. Neither predictions of ingroup contributions, nor predictions of outgroup contributions alone are enough to explain the size of the bias. Rather, it seems to be an interaction of the two. In addition, neither the

absolute level of identification with the ingroup, nor the preference for ingroup identity relative to the outgroup identity, contributed to the explanation.

At the same time, the level of identity was a significant predictor of bias only in the Control condition, as predicted by Social Identity Theory. The failure of the Control condition to replicate Yamagishi's findings (Yamagishi, Jin, & Kiyonari, 1999) casts a shadow of doubt on all the other results. It is possible that my experimental design did not successfully eliminate individual's perceptions of independence from the group's fate. If this is the case, it is possible that all of my results are nothing but an experimental artefact. However, the fact that identification did not contribute at all to the explanation of bias in the Matched and Interdependent conditions speaks against this interpretation. If the experiment was functionally equivalent across conditions, then identification should operate as the proximate mechanism of bias in all three of them.

An alternative explanation is that the Public Goods game in some way provided a justification for the bias participants would have committed anyway (Dawes, 1980). In this way, when the justification is available, it is used instead of levels of social identification. However, if this was the case, levels social identification should contribute to the explanation of the bias, or at least correlate with the size of the bias, even in the Matched and Interdependent conditions, which was not the case.

Additionally, I found that managing group resources across group lines does not lower the intended contributions to the public good. This was an interesting result since it contradicts the macro-level findings from real life which suggests that heterogeneous societies contribute less to the public goods, eventually leading to their collapse. Even though the participant's intended contributions were just that – reports of intentions, rather than incentivized behaviour – they pose an interesting conundrum. Mine was not

the only study which has shown the same result (Hugh-Jones & Perroni, 2014; 2017). Thus we must ask, if a mismatch in group identities is not enough to elicit the sort of reduction in efforts to manage group resources which we see time and again in heterogeneous communities, what factors are decisive in accounting for those real-life findings? In other words, what exactly causes the collapse of public goods when they are managed by diverse groups?

### **General Discussion**

The current study was exploratory in nature and constitutes only the beginning of an investigation into the impact of common resource management on intergroup relations. The motivation behind the bias exhibited across conditions is currently unclear. Nevertheless, I will consider possible interpretations and future research directions.

I observed a consistent and severe negative bias against independent outgroups in the face of consciousness of the common resource management dilemma within the group. Ostensibly, this cannot be explained by investment into one's own standing with other ingroup members, since no such opportunities were afforded. Even if they were, previous research suggests that this should motivate people to benefit the ingroup, but not derogate against the outgroup by maximizing the difference. Thus, in a non-zero-sum allocation game, like the one I had used, we would expect maximum allocations to the ingroup, and maximum or near-maximum allocations to the outgroup.

If the consciousness of the common resource dilemma is indeed the variable which enticed participants whose rewards were independent of the group's fate to maximize the difference between the ingroup and the outgroup, one interpretation may be that consciousness of a common resource within the group automatically frames the outgroup as a threat. Unfortunately, I have not collected data which would indicate whether the



participants framed the experimental situations as more competitive (aggressive, threatening) or more cooperative (peaceable, friendly). However, realistic conflict theories (Fearon, 1995; Levine & Campbell, 1972) would predict that reminding people of a finite and uncertain resource within the group may increase security concerns which can spill over into intergroup behaviour. The same logic holds for groups who share the management of such a resource. Without the ingroup-bounded depersonalized trust, or the network of generalized reciprocity which supports it, group-level interdependence can be seen as even more uncertain, risky and threatening.

The effect of threat on intergroup bias is inconsistent. Realistic and symbolic threat perception (Stephan & Stephan, 1996, 2000) have certainly been shown to drive more negative attitudes towards outgroups. However, Simunovic, Mifune and Yamagishi (2013; 2016) tested fear-based aggression between groups in a Preemptive Strike game (PSG), which was designed specifically for this purpose. In the PSG, participants were paired up and had to choose, in real time, between pushing a red button, or doing nothing. If both players did nothing, they both received the highest possible payoff, making this the perfectly rational strategy. However, the first person to push the red button would lose a certain portion of their reward. At the same time, the attacked player would lose a more substantial portion of the reward, as well as their ability to attack in turn. In this way, two incentives were dominant in the PSG: fear and spite. It seems like a sound expectation that both of those are less common among ingroup members rather than outgroup members, yet no intergroup bias was observed in the PSG. Simunovic and colleagues concluded that, having no opportunities for ingroup-bounded generalized reciprocity, the ingroup and outgroup were meaningless categories. If the bias observed in the current study is the result of threat-perception, then participants conscious of a common resource management

dilemma within, or between groups, should exhibit a greater attack rate against the outgroup in the PSG, which is a question for the future.

An alternative explanation is that the bias we observed had nothing whatsoever to do with perceived threat, but rather with the engagement of long-term thinking. While participants may have recognized that they have no immediate interest in derogating against the outgroup, the presence of a common resource management dilemma may have forced them to consider a future in which they are interdependent on the ingroup indeed. Under such conditions, it is in their interest to show ingroup loyalty and invest into future interaction. In this experiment, the only way in which participants could do that is by deliberately maximizing the difference between ingroup and outgroup outcomes. This second interpretation would force us to consider the possibility that group-level interdependence between groups is, even in the long run, not seen in a favourable light. One way in which to test the validity of this hypothesis is to force participants to make decisions under time constraint, which has been shown to elicit more default, heuristic-based behaviour, and – by necessity – discourages long-term thinking. Alternatively, long-term thinking may be primed on an individual level, through reminders of mortality, or life-course planning, such as having participants recount the decision-making process connected to big life-style changes such as having children, or putting money aside for retirement.

Finally, I discuss implications of my findings for evolutionary social sciences. The fact humans may have managed common resources in an increasingly complex way throughout their evolutionary history, suggests that there may exist psychological mechanisms formulated to respond to it. Certainly, these mechanisms operate within the group as sense of fairness, the norm of reciprocity, and ingroup loyalty. It is more

controversial to suggest they may have had an impact on intergroup behaviour. If the consciousness of ingroup-bounded common resource management dilemmas indeed elicit outgroup negative bias, we may expect that in the period of human cultural and evolutionary history in which resources of the kind I had described (i.e. those which require human agency and coordination before they can be exploited) emerge, we should see an increase in intergroup conflict. This would be reduced as institutions are put into place to manage the common resources, and flare up each time those institutions seem to fail.

There is an additional, theoretical question which must be addressed: if interdependence on common resources is not enough to open group boundaries and build communities, what is? It seems logically inconsistent to claim on the one hand that interdependence structures make human groups “function”, supporting the development of a common social identity and the establishment of depersonalized trust, while on the other hand claiming that interdependence also increases intergroup bias, strengthening group boundaries and promoting conflict between groups.

The easiest way to address this issue is to discuss Buchan and colleague’s (2009) study from the nested social dilemma literature – namely, that globalization on the level of the individual and their community actually leads to less intergroup bias. In order to explain this discrepancy, three topics issues must be addressed: firstly, the difference between heterogeneity and levels of globalization, secondly, the different conceptualization of intergroup bias, and thirdly, the difference between collective and relational social identification.

Heterogeneity is defined merely as the presence of outgroup within the framework of a superordinate group. Globalization, however, is defined as the rate of exchange of ideas and other goods between groups. In the supplementary material of Buchan and colleague’s

work, we see that both the individual and country-level measurement of globalization is, in fact, the measure of engagement with the cultural and material artefacts originating in other national and ethnic contexts. In other words, it is a measure of between-group contact that the individual introduces into their life, and that their entire community promotes and nourishes.

The researchers themselves agree – the positive effect globalization has on the suspension of intergroup bias, as seen by more universalist choices in the multilevel public goods game, should be put down to the growth of the participants' interpersonal networks to include members of outgroups, rather than mere presence of those outgroups. One may say that heterogeneity must exist first to provide the opportunity for such exchanges to take place. However, that still does not mean that heterogeneity itself is enough to promote peace. Rather, an element of interpersonal exchange – what Granovetter called “weak ties” (1973) - must be present, building the depersonalized trust required within the group by entering dyadic exchanges with outgroup members. Given that high levels of globalization already mean group boundaries have been loosened and made more permeable, this has led to an opportunity to generate trust, meaning that the dilemma inherent in managing common resources across groups has become less problematic.

Secondly, Buchan and colleagues' work does not provide a test of intergroup bias as we have conceptualized it here – independent allocations to unconnected ingroup and outgroup targets. Instead, their measure of intergroup bias is the willingness to invest in a local, subgroup common resource pool, or in a global, superordinate group common resource pool. It is important to note that the superordinate pool potentially carried greater rewards for the individual, thus making it the self-interested choice given that the participants predicted others will behave the same way. Once portrayed this way, the findings cease to

be surprising: in countries, and for people, who have experienced more frequent interaction with outgroup members, interpersonal interdependence has been established across group boundaries. Thus, enough trust may be shared between groups to promote the choice which benefits not only the individual but also the greatest number of other participants, i.e. a universalist choice. Those people and communities in which fewer exchanges between members of different groups took place, the strategies are necessarily more parochial – people chose to take part in the dilemma they were more sure they could solve. While I cannot say that contributions to the subgroup's resource were not a demonstration of some type of intergroup bias, it is difficult to compare it to the one tested in this study, and discussed in the literature (e.g. Hjort, 2013; Montalvo & Reynal-Querol, 2005).

From this study, I can conclude only that presenting members of two, previously unconnected groups with the social dilemma inherent in common resource management can nurture conflict between them. For reasons I can only speculate, it seems not to matter whether this dilemma is shared across group boundaries (as in the Interdependent condition in Study 2), or separated across group boundaries (as in Study 1 and the Matched condition in Study 2). This conflict may be result of a lack of a network of generalized reciprocity which would generate trust on an interpersonal level. Without this network being established not only within the group (where it is assumed; Yamagishi, 2007), but also between groups, the dilemma inherent in common resource management causes group members to maximize the difference between their own and the outgroup, even when this difference maximization does not benefit the ingroup in any immediate way. With the establishment of such a network of exchanges, the group boundaries become more permeable allowing for trust to be tested and carried over from the ingroup to include the interdependent outgroup.

Finally, we arrive at the issue of collective and relational social identity. It stands to reason that, in order to solve the dilemmas resulting from communal living, humans had to be able to understand the differences between individual and collective rationality. This, logically, entails the ability to perceive the group as an entity, beyond the immediate interpersonal network of the individual. Previous research suggests that there is a universality of ingroup/outgroup concepts beyond the concepts of family or village (Brewer, 1986; Brewer & Campbell, 1976; Levine & Campbell, 1972). If this is true, we would expect a difference in identification with group members, and identification with the group, and indeed, we see just that. In the discussions of social identity, researchers have found evidence of a duality (Brewer & Gardner, 1996; Prentice, Miller, & Lightdale, 1994). One type of social identity, called relational identification, stems from knowledge of previous interactions with other individuals, while the other, collective identification, stems from a meta-cognition of the group. I propose that collective identity would logically have to be constructed as more exclusive and would be more likely to be juxtaposed against outgroup categories, breeding conflict<sup>22</sup>.

Variations in relational identification should be connected more strongly to the establishment of a personal network of exchanges than they are to juxtaposition of the group against the group. Meanwhile, variations in collective identification levels should be connected to the awareness of group performance and success in absolute terms, as well as relative to other compatible groups. The way in which the intergroup contact is framed, i.e.

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<sup>22</sup> Hamamura (2017) recently published a study which not only created a more sensitive measure of social identity I have called for, but also showed that collective identification is connected to less positive attitudes towards diversity (cf. Lee, Adair, Mannix, & Kim, 2012). This was in accordance to my prediction. Since I have written this section before Hamamura's work was published, I chose to postpone the discussion of his work for the conclusion, leaving a record of my prediction here.

how group members perceive the interaction, will presumably influence the emergence and importance of either type of identification as a behavioural cue.

In a heterogeneous society, it is likely that people will eventually enter into interpersonal exchanges across group borders. The more the individual identifies with their ingroup in terms of relationships, rather than category, the more easily they may enter into such relationships. This gives them a chance to establish “weak ties” (Granovetter, 1973; Kadushin, 2012), pathways between groups which serve as mechanisms for exchanging ideas and goods between different networks of people. Since these exchanges are dyadic, they provide a relatively low-cost testing ground. The dilemma in each interaction impacts only the two individuals, not the outcomes of the whole group. These small exchanges in the face of limited risk may serve (given that the exchanges were mutually beneficial) as fertile ground for trust to be established between networked people, and later, between the groups these people belong to. Finally, such a process might lead to the emergence (or growing support for) a superordinate identity. Thus, stressing the ingroup as a relational construct, makes it easier to relate to outgroup members as well. If the intergroup exchanges are based solely on such person-to-person interactions, and providing a larger, superordinate group framework is available as a reference point, people might begin to interpret their interdependence with the outgroup in positive terms, suspending their bias on average.

However, if the exchange happening in a heterogeneous, superordinate group puts forward the question of group-level interdependence without any chance for participants to create bridges between the subgroups, there is no trust between subgroups capable of negotiating the dilemma they encounter. Furthermore, since the dilemma occurs between subgroups, the cognition of the problem is necessarily related to the meta-cognition of the group, and thus to collective identification. This type of exchange neither supports the

understanding of groups as communities of related individuals, nor the perception of those communities as permeable. Thus, no weak ties can be established, and no trust tested. Rather, as in the current study, people have to scramble to manage a social dilemma with only the trust they implicitly share with subgroup members to fall back on.

While social identity was measured in the current study, the instrument used was not sensitive enough to differentiate between collective and relational identities. However, it is possible that levels of collective identification would have accounted for the bias in predictions of contribution to the common good, and through them, to the size of the intergroup bias. Levels of relational identification as well as the perceived similarity and positivity of group members (the actual measure of social identity in this study), should not contribute to the explanation of the bias.



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**Chapter 5.**

**Conclusion**

### **Summary of Empirical Data**

I began this work by delimiting some of the problems faced by heterogeneous societies. Within-group heterogeneity, here defined as the emergence of distinct subgroups within the framework of a larger, superordinate group, has been shown to lead to internal conflict and a collapse of group resources (e.g. Montalvo & Reynal-Querol, 2005). Minorities and majorities which should cooperate to maintain the resources they depend on, fail to contribute to their maintenance. Lacking the reassurance that the dilemma inherent in group-level interdependence will be successfully managed across subgroups (e.g. that the sanctioning system will reliably target freeriders in the minority and majority alike), participants in the dilemma withdraw support for the common resource. At the same time, the minority's very presence is, a priori, construed as a threat by the majority group, anticipating a lack of cohesion and a loss of what Festinger called "group locomotion" i.e. the group's abilities to achieve common goals (Festinger, 1957). For this reason, the minority is ostracized, distrusted, shut out, and even victimized by the majority. This treatment, unsurprisingly, damages the psychological and economic wellbeing of minority groups, stunting their ability (and willingness) to, in turn, cooperate with the majority.

My goal in this thesis was to explain these phenomena by linking the behaviours they engender to the structural characteristics of the interaction and the situation. For this, I have used an extended version of Structural Goal Expectation theory which relies on the analysis of human goals and expectations as catalysts of behaviour. This analysis takes into consideration not only the decision-makers' biases, attitudes, and preferences, but also the context in which the decision is being made. Thus, what interested me most was: what minimal situational factors are needed in order to replicate, in a laboratory setting, the sort of problems with heterogeneity that we see in real-world societies?

Rather than merely the result of embedded or conflicting social identities, I argued these problems result from the mismatch between social identity and the interdependence structure of the group. As I have laid out in Chapter 2, social identity serves as an important cue for whom to trust and how to behave. Human psychology has equipped us with an emotional and cognitive relationship to our group membership in order to reduce the risk of “misbehaving” in intergroup situations. The error management strategy in this case is parochial, meaning that erring on the side of caution in intergroup situations always means sticking with one’s own. However, identification itself is not enough to endorse parochialism. Social identity does not operate in a vacuum, but in a structured social situation which humans are uniquely equipped to perceive, judge, and counter. Thus, asking questions of intergroup behaviour in a structured, incentivized context seems more likely to produce accurate predictions about human behaviour, rather than relying merely on identification levels.

In this case, I was interested what common resource management, a standard social dilemma existing in all human groups, did for intergroup bias in three cases: 1) between groups of unequal size which share the management of the resource, 2) between groups of equal size which share the management of the resource, and 3) between groups which manage the resource independently. I had predictions only for the first case – that the majority’s expectation minority members will freeride on the public good will lead them to exhibit true outgroup hate. At the same time, this should not hold true for the minority, who should suspend intergroup bias given that they have no dilemma to solve.

Indeed, the empirical data I had collected supports my propositions. In Chapter 3, I show how engaging the consciousness of a resource management dilemma between a minority and majority produces an asymmetrical negative bias. When independent

individual decision-makers were made aware of a Public Goods game being played by other (minority and majority) group members, the decision makers who belonged to the majority discriminated more frequently and more harshly than the minority. These results were not explained by levels of social identification, nor by the expectation of future reciprocity by other majority members, but by the majority's prediction minority members will contribute less to the common good. The fact that this effect occurred in minimal groups, in the laboratory, and despite the fact the individual could not expect reciprocal treatment or reputation gains, is a powerful indicator that the behaviour constitutes a default strategy for dealing with heterogeneous groups.

Despite the fact minority members have previously been shown to exhibit more discrimination than the majority (e.g. Leonardelli & Brewer, 2001), when managing common resources with the majority they showed low or non-significant levels of intergroup bias, both in terms of predicted contributions to the resource and in terms of allocations to different targets. In other words, they suspended bias when faced with a common resource management dilemma. As yet, it is unclear what the motivations for the lack of bias might be. We can speculate that reminding the minority of their interdependence with the majority, increases positive attitudes towards the majority, engages greater levels of identification with the superordinate group, and elicits more investment into the outcomes of the superordinate group rather than the minority subgroup. We might expect the minority to feel more included and powerful as a result.

From a sGET and evolutionary perspective, suspending intergroup bias in the presence of group-level interdependence can be considered a sound long-term strategy for several reasons. The minority's smaller size usually means fewer resources can be monopolized, generated and maintained. In addition, any defection is more costly. With the

majority in tow, the resource is increased, while the cost of individual defection is reduced. In addition, reliance on common resources can foster universalism simply by providing a framework for mutual cooperation which can only benefit the minority. In this way, it can bolster the superordinate identity by making it “real”, i.e. matching it with a functioning network of exchange. At the same time, group-level interdependence might also serve as a reminder of the possibility for negative reciprocity from majority members – again making discrimination a strategy less likely to maximize fitness.

We can say that reliance on common resources in heterogeneous societies *in and of itself* incites outgroup hate from the side of the majority, answering my question about the minimal necessary situational factors which elicit conflict between minorities and majorities. On the other hand, we can give a more positive slant to my results and say that consciousness of common resource management in a heterogeneous society is an important component of peace-building between minorities and majorities, in the sense that it reduces discrimination on the part of the minority. However, the less optimistic effect of group-level interdependence seems to be the more basic, as seen from the results in the other two cases I had investigated: that of independent and interdependent groups of equal size. When people are conscious of a common resource management dilemma taking place, whether between or within the group, they exhibit outgroup hate. In other words, they behave like the majority, interpreting any sort of social dilemma as grounds to pre-emptively reduce the outcomes of the outgroup.

In Chapter 4, I address these two cases in turn by having participants supervise a Public Goods game played either across group boundaries, or within them. My logic was that the asymmetry in the case of minorities and majorities could be the result of either group-level interdependence, or relative group size, or an interaction of both. These three

structural factors were confounded in the experimental design in Chapter 3. Thus, the goal was to eliminate relative group size as a factor, and look solely at the impact of group-level interdependence on intergroup bias, more precisely outgroup hate. In addition, I sought to replicate findings from BGR (Yamagishi, Jin, & Kiyonari, 1999) which demonstrated that intergroup bias should not occur if there is no interdependence structure in place to impact the individual decision-makers' outcomes.

However, the results showed participants discriminated against the outgroup not only in the two conditions engendering a common resource dilemma, but also in the control condition, in which there was no group-level, or interpersonal interdependence. This failure of replication casts a shadow of doubt on all the results I have presented, since it can mean that the experimental design, or Yamagishi's theory of interdependence (upon I have built my version of sGET) are faulty. Such an interpretation is possible, but there is good reason to reject it.

Firstly, the results I have presented in Chapter 3, for the case of minority and majority management of common resources, use the same manipulation. Yet, they demonstrate an asymmetry which cannot be explained by Social Identity theory alone, nor by BGR alone. However, it was predicted correctly by sGET. Thus, even if the experimental design has not truly eliminated the interpersonal interdependence, the results are striking and specific.

Secondly, while there was no difference in behaviour across the conditions of Chapter 4, there were differences in which variables explained that behaviour. In the control condition, the intergroup bias was indeed explained best by levels of identification with the ingroup. This was not true for the two conditions which introduced group-level interdependence where the reasons for discriminating against the outgroup were the result

of predicting they would cheat on the public good. This could be just a convenient justification (e.g. Dawes, McTavish, & Shaklee, 1977) tacked on to decisions participants were anyways going to make. Nevertheless, the fact levels of identification could not account for the bias cannot be ignored.

My interpretation of the problematic results from Chapter 4 is that group-level interdependence merely engaged the same parochial strategy for dealing with intergroup situations that humans seem to use across dilemma-prone situations. This can either be the result of perceived threat / competition, or the result of long-term thinking. Thus, common resources being managed in a heterogeneous group where the subgroups are of equal size, or in two homogeneous groups, can result in the common resource being perceived as a zero-sum game between groups. Alternatively, thinking about such a complex game as the Public Goods game, which has multiple steps and levels of impact (individual v. group) may engage long-term thinking. In intergroup situations, long-term thinking always means parochial thinking, since in the long run, the ingroup is more likely to impact the individual's fitness.

Interestingly, nowhere in my data have I found evidence that heterogeneous groups are necessarily destructive of the common resources. In Chapter 3, I have found no indication that minority members were going to contribute less money to the public good than majority members. While more research is needed, it would seem that minority freeriding (while it may occur under specific circumstances) is not to blame for the collapse of the public good we observe in real-life macro-level data. In Chapter 4, I have found no difference in intended contributions to the public good across the conditions. Whether the common resource was managed within (Matched condition) or between groups (Interdependent condition), the intended contributions as reported by the participants was

not significantly different. In fact, it was slightly higher in the Interdependent condition. The same (non) effect was reported by Hugh-Jones and Perroni (2014; 2017), strengthening my findings. However, this leaves the question open – what exactly is it that accounts for the loss of common resources when they are managed in diversity?

To summarize, in this thesis, my goal was to present a novel theoretical framework which seeks to connect human behaviour to situational factors. I have demonstrated its voracity on the problem of minority and majority intergroup conflict. I have argued that the common resource dilemma and discrimination between minorities and majorities are connected in the sense that they share a structural impetus. Moreover, they loop back into each other creating a vicious circle of self-fulfilling prophecy. The need to maintain common resources in heterogeneous groups engenders in itself a dilemma which starts the cycle. The fear of the majority that the minority will not contribute to the common resource fuels discrimination. In response, the minority has no choice but to reciprocate, cluster closer together, and reject contact with the majority, thus making the boundaries between the subgroups even less permeable, and the conflict between them all the more rooted. Importantly, this wall-building also prevents the successful management of the public good. Since the boundaries between minorities and majorities are reinforced, any mechanism for solving the common resource management dilemma is doomed to fail, starting the cycle all over again.

### **Limitations**

In this section, I will discuss the limitation of the research presented in the thesis. This criticism will be divided into two parts. The first will deal with the limitations of experimental design, and the conclusions we can draw from the studies presented in the



thesis. The second will deal with the theoretical limitations of the sGET as I have proposed it here.

In this thesis, I have almost exclusively used experimental methods, more precisely, experimental economic games. These games are meant to simulate interpersonal exchanges in a paradigmatic way, meaning, they present participants with an unrecognizable version of a situation they are likely to face in different domains in their lives. By recording human behaviour under such abstracted circumstances, researchers hope to ascertain default responses to certain situational factors and setups. The strength of using experimental economic games to gather information about human behaviour in diverse situations is that they can model a decontextualized exchange between humans without the additional noise which appears in reality. Thus, an allocation game in which the allocator has no vested interest in behaving one way or another – such as the one I have used in the thesis to measure intergroup bias – can be likened to making decisions about who to hire, or where to direct one's charitable donations. Situating such an exchange in an intergroup context allows the researcher to test whether people will, on average, engage a more or less parochial strategy to handle the interaction.

However, some weaknesses are inherent in this sort of experimental design. Firstly, the experiment often uses money or stand-ins for money to create a sense of reality and real consequence for the participants. Some research has suggested that this engages a more strategic, rational thinking (Smith & Walker, 1993), what is to say, they behave closer to the model of the self-interested, profit-maximizing *Homo economicus*. This might mean that in real life, participants from the majority might have engaged in more empathy and universalism, treating minority members equally, or even preferentially. On the other hand, minority members might have behaved in a more discriminatory way out of spite or

fear. There are several possible responses to this. Firstly, the issues with using money in economic games mostly have to do with games in which the participants' payoffs are variable. In other words, if the individual's rewards are interdependent with rewards of other participants, the individual will behave in a more profit-maximizing way than they might do in exchanges not involving money. However, in my design, the individual decision-maker's rewards were fixed in advance so this criticism applies only marginally.

Furthermore, in my experience, using money in economic games is the simplest way to get participants to pay attention to the design, and take their decisions within it seriously. Monetary incentives for behaviour, if they are significant enough, are a universal cue that the impact one's decisions have on others is real. In my experiments, it was important for the participants to realize they would have real impact on others.

Another general criticism of the use of economic games to test human behaviour is that the games can be quite complex and confusing to the participants. The complexity of the experimental design was addressed in Study 1 after participants in the first three experimental sessions (not included in the final analysis) reported high levels of confusion during debriefing. Thus, the term "supervisor" was included in the experimental design to describe the decision-makers, and separate them from the participants supposedly taking part in a Public Goods game. The design was further streamlined in Study 2, where extraneous features like a subdivision of minimal groups into a minimal minority and majority using a second perception task were eliminated. However, as I have mentioned before, the games themselves are complex, it is uncommon for participants to have to keep two games in mind simultaneously, and most of the participants in both studies are unlikely to have encountered them before. While this naivety makes them "better"

participants, it may also have impacted their behaviour (although, again, this does not explain the presence of an asymmetry between minority and majority decision-makers).

For this reason, I had introduced manipulations checks to make sure the participants understood the content and set up of the game. While the checks can sometimes be used as data to eliminate the participants who got the answers wrong, I attempted to conserve as many responses as possible. My manipulation checks were done as a TRUE or FALSE test in which participants were asked to evaluate the accuracy of statements pertaining to the experimental procedure or the way the games work. While some participants got the answers wrong, they were immediately corrected and offered to re-read the instructions (See Supplementary Materials). An additional manipulation check in the post-experimental questionnaire nevertheless revealed there was confusion about some aspects of the study. This was within expected levels.

When it comes to the failure of the replication I had discussed at length in Chapter 4, it is possible that the complexity of the design can account for the intergroup bias in the Control. In the case of the Control condition, the guarantee of a fixed reward and the separation of the participants online from the recipients supposedly engaging in another activity in the laboratory might have been too finicky and subtle a manipulation. This type of manipulation was successfully used in the 1993 paper by Karp, Jin, Yamagishi and Shinotsuka to break down the assumed interpersonal interdependence between ingroup members, which was why I had used it here. However, Yamagishi and Mifune (2015) have shown that the same can be achieved by the manipulation of commonality of knowledge of group membership. In other words, by unilaterally withholding information on who is a group member, Yamagishi and Mifune discontinued reputation concerns and expectations of future reciprocity as possible motivations for behaving in a parochial, ingroup-oriented

way. Apart from being more elegant, it seems to me that this experimental manipulation may be more easily understood by the participants. Thus, one of the future goals of this research is to redo the studies presented in the empirical chapters while manipulating community of knowledge.

In addition, this complexity of design meant to discontinue interpersonal interdependence could have resulted in the lack of difference between the other two conditions from Chapter 4, the Interdependent (two groups share the management of common resources) and the Matched condition (two groups manage independent common resources separately). In the experimental design, the conditions differed from each other in only a few words, denoting whether the Public Goods game was taking part with all participants in the experiments irrespective of group membership, or with Green/Blue group members separately<sup>23</sup>. With everything else the participants had to keep track of, this detail might have fallen off by the wayside. In the future, it might be prudent to add a graphic depiction and reminder of the differences between conditions. Perhaps, in addition, it would be important to explicitly state that one group's rewards in the Public Goods game does not, and cannot, impact the other group's rewards in the Public Goods game, when it comes to the Matched condition.

Unfortunately, none of the limitations inherent in the use of economic games can be addressed in this work. As with any research which uses a single method of data collection, we can only gain confidence in the results presented here once other methods allow for a triangulation. I will discuss some of these methods in the next section of the Conclusion.

The use of the Public Goods game as a model for the common resource management

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<sup>23</sup> While the manipulation distinguishing the Interdependent from the Matched condition was reaffirmed several times (see Supplementary Materials for more details), no check was performed to make sure whether this repetition alone was enough to achieve the desired effect.

dilemma can also be criticized. The give-some dilemma, exemplified in this thesis, relies on the tradeoff between actively participating in the generation of a public good, and passively consuming it. Meanwhile, the take-some dilemma relies on the tradeoff between preserving the common good for long-term use, and securing one's maximum benefit immediately. It is entirely possible that the give-some dilemma has a different impact to the take-some dilemma rest on different psychological mechanisms, and thus would elicit a different response in my study. In addition, a take-some dilemma in which the resource itself will not replenish (standing in for such slow-replenishing resources as oil and natural gas, for example) can represent a case onto itself. Whatever the case, testing my findings on multiple configurations of the n-persona social dilemma will be a necessary future step.

Finally, a criticism of the use of "supervisor" and "supervision" to describe the participants and their task in the experiment should be noted once more. While Allport's (1954; 1958) theory of intergroup contact states that differences in status hinder reductions in intergroup hostilities, and even promote them (Gaertner & Dovidio, 2005), this applies to a status difference between groups, rather than between individuals. Here, the status difference between the "supervisor" and the "recipients" applied only to the individual decision-makers, as opposed to the recipients from both the decision-maker's ingroup and outgroup. Even if the status difference between individuals in some way altered the results, this alone is again not enough to explain the asymmetry between minority versus majority members' behaviour.

Next, we can turn to the criticisms which can be levelled at my expanded version of sGET in terms of the theoretical model and predictions it makes. First and most obvious of those is the fact that sGET in its current form is tentative at best. Even though I have made an attempt to explain what the "structural" part of structural Goal/Expectation

theory is, the two steps in the analysis of structure are merely a starting point. While it would seem that discussing the structure of the interaction humans are presented with, and the structure of the situation in which they find themselves, are a sound spring board, my current model of sGET lacks any sort of general predictions. For example, I cannot say whether relative group size (a situational factor) will impact human behaviour differently in games with more interdependence (such as the Trust game, or the Prisoner's Dilemma game) as opposed to less interdependence (such as the allocation game I had used, or the Dictator game). Necessarily, these sort of more general predictions can only come after sGET has been tested on more differently structured situations, and different interactions.

sGET makes no predictions about intergroup attitude formation. While this can be construed as a criticism of the theory, it should be noted that the way attitudes (particularly long lasting attitudes which get included into stereotypes) are formed about different groups are not where sGET is most useful. Rather, sGET is explicitly concerned only with the prediction of human behaviour. Nevertheless, the role of intergroup attitudes in intergroup behaviours within this framework should be clarified.

The same is true for levels of social identification which, as we have seen, do not predict behaviour completely, and sometimes not at all. Nevertheless, social identity and identification are important cues for behaviour in intergroup situations. While Chapter 2 discusses the evolutionary role of social identity formation and expression, its role in sGET's idea of intergroup behaviour has yet to be investigated. Since in sGET, I talk about four different types of interdependence which is likely to occur in group contexts, I argue a more sensitive measurement of social identity should be applied. In particular, this measurement should distinguish between social identity as a connection to a group identity (the category of the group), as opposed to group members (the network contained within

that category). Put another way, this measurement should be sensitive to collective identification, as opposed to relational identification (Brewer & Gardner, 1996; Prentice, Miller, & Lightdale, 1994). The idea here is that collective identification, based on the meta-cognition of the group, might have a greater impact on behaviour in situations where such cognition is more readily available, specifically when it comes to group-level, between-group and socio-cultural interdependence. Meanwhile, relational identification, based on the cognition of the connection to other group members, may have a greater impact in intergroup situations in which interpersonal interdependence is stressed. Alternatively, different types of identification may support different strategies across situations. For example, collective identification could be related to more parochial strategies of behaviour in dilemma-engendering situations, since the cognitive and emotional connection it supports is related to the group category rather than the group members. Since relational identification is based on the cognitive and emotional connection to the ingroup network, it may reduce the intergroup bias and promote more universalist strategies if the individual's actual, local ingroup network is not present.

### **Future Directions**

The present research has shown that minority and majority dynamics can shift depending on the situation which these groups have to solve. Activating the awareness of common resource management leads to majority showing more negative bias, while the minority suspends the bias under the same circumstances. In discussing future directions, I will outline a series of research topics along with a proposal on how to address each of them. These topics and projects build directly on the results presented in this thesis, addressing limitations or echoing ideas from previous chapters. I believe they constitute the next logical step in the investigation of problems we encounter in diverse societies, namely:

discrimination, the collapse of the public goods, and the cause-and-effect loop I propose exists between the two. While we have been discussing the impact of group-level interdependence on groups of equal size, minority/majority relations will be the main focus of the future work proposed here. Thus, the three major points of interest for future investigation should be,

Does **heterogeneity in and of itself cause a decrease in the common resources**, and if not, what attitudinal and structural factors would cause such a decrease?

What mechanisms promote the **harsher, more frequent discrimination the majority** displayed against minority members when common resources have to be managed between them?

What mechanisms promote the **suspension of discriminatory behaviour the minority** displayed towards the majority members when common resources have to be managed between them?

The proposed projects' main purpose is to answer these basic points and provide more internal and external validity to the results presented in the thesis, as well as investigate how to manipulate the emergence of the troubling phenomena of asymmetrical discrimination in minority and majority contexts. In addition, the projects' secondary purpose is theory-building, particularly when it comes to integrating social identity with sGET. The methods to be used will mainly be experimental, however, seeing how I have already argued for the need for triangulation, other methods will be explored, namely survey data and vignette studies.

The different designs of the projects are tentative, although some of them are dictated by the design of the PhD project. The reason for this is to preserve the ability to



compare data from the present and the future project. In addition, as I have discussed before, I plan to redeem my word to participants who thought they were impacting others with their allocations in Study 2, thus continuing the trend to reduce the use of deception in psychological experiments.

*Impact of diversity and relative group size on common resource management*

Macro-level data I have discussed at length has found, with a considerable degree of consistency, that diversity has a negative impact on the management of group resources (cf. Santos, Santos, & Pacheco, 2008). This has been found in both the give-some (e.g. Public Goods game), and the take-some (e.g. Common resource dilemma) social dilemmas. Once more, sGET will be the main theoretical axis for this investigation. The central question posed by sGET is thus, under which conditions will diversity in society negatively impact the contributions to the common good? This research topic and the design attached to it will form the basis of future investigations into the dynamics of minority and majority conflict, and can be thought of as phase one of the proposed research projects, upon which all the other research designs presented in this section are built.

While secondary results presented in this thesis, but also results from studies by Hugh-Jones and Perroni (2014; 2017), show that it is unlikely that diversity, represented in the lab by minimal minority/ majority divisions, will result in a loss of public goods, this is nevertheless a starting point. It is likely that additional situational factors will have to be manipulated before diversity results in lower contributions to the management of a common resource, as I will discuss below. The additional purpose of this project is to gather data which might point to what these factors might be, on an attitudinal as well as a structural level.

The minimal minority/majority division from Study 2 (Chapter 3) will be replicated as participants recruited on Jacobs University campus play a Public Goods game. In addition, a true Control condition will be added in which participants play the PGG with other group members, and with no knowledge of diversity within the group, or the existence of another group. Since I have used the give-some dilemma, modelled by the Public Goods game, in this thesis, I plan to continue using it in the follow-up project.

The participants' rewards for their participation will be decided by the winnings from the PGG, but also by randomly matching participants in each condition to one of the supervisors who had previously made their decisions under the same conditions. Thus, the participants' payoffs will vary based on their own decisions, the decisions of all other players, and the decisions of the supervisors from the PhD project.

The main comparison to be made will be in donation patterns between conditions. If diversity in and of itself is enough to elicit smaller giving to the public good, then a difference should be apparent between the Control conditions and the minority/majority conditions. In addition, we will test whether minority as opposed to majority members' donations to the public good differ significantly. Since we can assume that neither of these will be the case, additional data dealing with possible attitudinal and structural factors which might induce 1) greater defection from one side, or 2) predictions of greater defection from the other side, will be gathered using vignettes. The vignettes will describe slightly different experimental paradigms within which participants are invited to consider how they would behave under the same circumstances. This form of self-report has the obvious weakness that it asks participants to imagine an already abstract situation. However, it can serve as indication for which experimental paradigms are thought by the participants most likely to cause a shift in their behaviour. These will be discussed in more detail below.

*Impact of attitudinal and situational factors on the relationship between diversity and common resource management*

As I have argued above, previous research has shown that it is unlikely diversity and relative group size alone will be enough to cause a collapse of the public good managed across group lines. Thus, the question becomes, what will be enough? In other words, what attitudinal and situational factors have to be present before the minority and majority become incapable of managing a public good together without significant loss when compared to a homogeneous group? Self-reported responses to different experimental situations, as well as general attitudes towards relevant concepts, will be related to actual behaviour in the PGG.

When it comes to attitudinal factors which might induce defection or predictions of defection, these include general attitudes towards public goods, perception of the experimental situation as either more competitive or more cooperative, levels of relational/collective identification with the minimal group, ideas about the boundedness of group resources or interpersonal networks, etc. Importantly for the arguments I make in this thesis, the participant's trait and situational tendencies to think in long-term outcomes will be tested for their impact on donations to the PGG. In addition, real-life attitudes towards public goods, different minority groups, opinions of them, and predictions of their behaviour, will be gathered and related to behaviour in the game. However, it is unlikely that a student sample will provide the variance needed to establish how these attitudes influence behaviour in the PGG and treatment of minority/majority members with group-level interdependence in play. For that reason, these questions will be elaborated upon in the last of the projects I will describe in this section.

In terms of structural factors, the possibilities are numerous, but three will be investigated in particular: type of public good, reputation transparency within the superordinate group, and reward/punishment structures meant to enforce cooperation. Using vignettes to ask participants' intended behaviour, and predictions' of other participants' behaviour in the face of different structural characteristics, the idea is to get a better grasp of how people would respond given a slightly different game paradigm. The setting of the vignettes will remain a laboratory setting, but different manipulations will be suggested to participants, whereupon they will be asked to predict their own, and others' behaviour. Each participant will be presented with only one variable which differs from the original game in a between-subjects design. Since they will have already experienced the basic PGG, the participants should have little trouble imagining a modified version of it.

The first vignette will have to do with the type of public good managed. The PGG, which I have used so far, encapsulates a give-some-dilemma in which participants have to actively contribute to the generation of a public good. Take-some dilemmas, however, represented by the Common Resource dilemma game, centre around the way a community will handle an existing resource. This resource will either replenish after each round, or it is finite, meaning that it is only a matter of time before it can no longer be exploited. A depleting resource, and particularly one which cannot be refilled, is likely to present a greater temptation to freeride, cause the majority to predict more cheating from the minority's side, and thus a harsher response to (assumed) freeriders. In addition, it might be possible that the minority does indeed overexploit the resource under the take-some dilemma parameters.

Monitoring is a basic prerequisite for managing a social dilemma. Thus, the permeability of group boundaries in terms of monitoring will be another target of the

vignettes. For example, the participants will be asked about their own and other's projected behaviour in the PGG given that each player's contributions are recorded and available for review by the entire group (global monitoring). In comparison, the player's contributions may only be available for review to the members of their subgroup (local monitoring). If the monitoring is global and thus reputation is transparent to the whole group, as opposed to only the subgroup, concerns about reputation should likewise extend to the whole group, engaging a more inclusive network of interpersonal exchange. My prediction is that such transparency might ease the majority's predictions of minority cheating, and by extension their negative attitudes towards them. At the same time,

When it comes to reward and punishment, there have been discussions about the effectiveness of peer punishment (to be discussed more below), versus punishment by an appointed dictator, an elected dictator, or by an automatic institutional mechanism (Ambrus & Greiner, 2015; Decker, Stiehler, & Strobel, 2003; Hilbe, Traulsen, Roehl, & Milinski, 2013). In the case of minorities and majorities, it is possible their intended contributions to the public good might change if, for example, there is a system of punishment in place which hinges on decisions made by an elected representative who is a majority member, as opposed to minority member. Alternatively, the contributions might differ if peer punishment is the "law of the land" but it is either shared among all the group members, or only subgroup members.

In addition, these reward and punishment systems can be just or unjust. Thus, we can introduce a system of automatic institutional punishment which targets minority or majority targets more often. Alternatively, we can introduce a system of institutional reward which accords greater added benefit of cooperation to minority or majority targets. The effect of unjust systems (or systems perceived to be unjust by one side or another) could

be detrimental not only to relations between interdependent groups, but also on the public good itself.

*Impact of diversity in common resource management on willingness to punish minority / majority freeriders*

From the studies presented in the thesis, I can at most say that the outgroup hate majority members demonstrated towards minority members was explained by predictions of the contributions to the common good. Yet the question remains whether the predictions elicited a need to punish the perceived freeriders, or were themselves the result of a priori fear that minority freeriders will eventually monopolize the group resource. To test the first of these possibilities, I propose to add a mock punishment stage to the PGG I have just discussed.

After taking part in the PGG, the participants will be presented with low, medium, and high contributors to the common resource in a post-experimental questionnaire. These targets' group membership will vary across the scenarios, meaning they will either be members of the ingroup (in the Control condition), the ingroup minority, or the ingroup majority (in the minority/majority condition). This strategy method of collecting data suffers from certain flaws. Since the PGG does not have a true punishment stage, the participants' decisions recorded in the scenarios will not be followed through, and thus will not be costly to either the participant, or their targets. Nevertheless, it will give an indication whether greater punishment in diverse societies is reserved for ingroup rather than outgroup members.

We can make opposing predictions about the outcomes of this test. On the one hand, we should expect greater sanctions reserved for ingroup rather than outgroup defectors, as Shinada and colleagues (Shinada, 2009; Shinada, Yamagishi, & Ohmura, 2009) showed

previously. Thus both minority and majority members, given that they are interested in maintaining a positive image of their group and maintaining the public good, should direct their harsher punishment at their own subgroup members.

However, based on the evidence I had presented in this work, as well as on Hugh-Jones' and Perroni's work on expropriation (2017), we would expect the majority to direct harsher punishment at minority members. By this I mean not only that low contributors in the minority will be targeted for harsher punishment than comparable majority defectors, but that medium and even high contributors from the minority will nevertheless be targeted. Minority members, however, might direct harsher punishment likewise at minority members, in an effort to manage "their own". They are likely to target low contributors in the majority for equally harsh punishment, but not medium or high contributors.

In addition, and as a follow up to this study, different methods of doleing out rewards and punishment should be considered as possible contributors to more, or less defection from the minority / majority members. As I have already discussed above, systems which rely on individual peer punishment, democratic punishment, institutionalized punishment, or a single dictator-like punisher, should be discussed and tested for their impact on minority / majority behaviour in the PGG, but also on their levels of conflict. While this additional question cannot be forced into this projects' strategy method as I have just described it, it can certainly build upon it at a later date.

***Impact of diversity in common resource management on defensive aggression***

As we have discussed above, one of the reasons for discrimination between minorities and majorities which share the management of a common resource is simply the idea majorities have that minorities will cheat. However, the connection of this prediction

to threat is less clear. If minorities are indeed targeted for harsher and more frequent punishment, it is possible that they are constructed as an a priori threat given the consciousness of group-level interdependence. Again, we may use the participants who have already participated in the PGG I proposed as the first phase of the follow-up research project. Participants who had already experienced common resource management in diverse groups will be assigned once more to the same minimal minority or majority. Thereafter they will be randomly paired with another participant and take part in a Preemptive Strike Game (PSG; Simunovic, Mifune, & Yamagishi, 2013). The participants will then play the PSG only once, paired with either ingroup or outgroup members. The game will be played for real stakes, without deception, which means that the participants' payoffs will vary depending on their own, and their pair's choices in the game.

The PSG was created as a strong test to measure defensive aggression. As such, it is appropriate not only for answering the research question on the motivations behind minority/majority discrimination in the face of common resource management (by connecting it to either fear or spite). It will also address the criticism that the measure of outgroup hate in this thesis did not include a personal cost to the decision-makers and thus, did not mimic true, aggressive outgroup hate.

The PSG mimics a first strike situation in which each side has the opportunity to destroy the other's ability to attack by pushing a red button. However, if neither player pushes the button during the time frame given in the game, they are both better off for it. Two rational, self-interested actors should wait the game ends and walk away with the highest possible payoff. However, the first participant to push the red button is safe from counterattack at a relatively small cost. The attacked player suffers a greater loss, and loses their ability to affect the first player's outcomes. The two motivations for attacking in



the PSG are therefore spite and fear. Simunovic, Mifune and Yamagishi (2013) have shown that the dominant motive when playing the game between (independent) groups or strangers is fear. Thus, if common resource management in diversity automatically frames the situation as a competitive, zero-sum game in which one group is likely to take advantage of the other, we should observe a greater attack rate in the Minority / Majority condition, rather than in the Control condition. In addition, if this threat-perception is higher for majority members, as the current studies suggest, we should observe a greater attack rate by majority members directed at the minority.

To distinguish between the fear and spite motives for pushing the red button in the PSG, an alternate version of the game will be included in the research design as a post-experimental vignette. In this version, two buttons are available to the participant – the red button, which protects the aggressor at a cost to themselves and the victim, and a blue button, which eliminates the possibility of a counter attack at a cost to the aggressor, but not the victim. In other words, by pushing the blue button, participants can protect themselves without damaging the other participant, a key component in spite. This version of the game is often asked in a scenario after participants had already experienced the original version of the PSG. Importantly for this project, it can hold the key to whether attack rates in the PSG between minorities and majorities are due to fear or spite. We may expect the minority to attack the majority out of fear, but, given the option, should choose the blue button rather than the red one. Meanwhile, if the majority is interested in reducing minority outcomes as well as protecting themselves, they should choose the red button irrespective of whether the blue button is available.

*Analysis of relationships between predictions of behaviour in group resource management, attitudes on group resource management, and attitudes towards diversity in one's community / society*

Based on what I have proposed here, members of majorities around the world should have a negative reaction to diversity in community the more they are invested in the management of common resources. In other words, the more an individual believes that group resources are crucial to the group's survival, the more sensitive they will be to cues that others will under-contribute or overexploit them. Likely, this will lead to negative attitudes towards diversity, multiculturalism, and particular minority groups.

The effect should be true only for those minority communities which represent a discernible body of interconnected people, particularly if they have (or seem to have) political influence. In other words, the minorities targeted are likely to be only the ones who have political and economic influence, and a recognizable, bounded network of exchange set up between them. Thus, for example, we can expect ethnic or sexual minorities to become targets, but not the deaf or blind communities.

This negative relationship between importance ascribed to the public good and the response to diversity in the face of common resource management should be mediated by their level of collective, rather than relational, social identity, as I have argued in Chapter 4. Furthermore, this should be particularly evident in the West. Yuki (2003) shows that Japanese see their ingroups as collectives of interconnected persons, while US Americans see them as more homogenous conglomerates. He further suggests that there might be a difference in how ingroup loyalty is constructed. Indeed, Hamamura (2017) has recently shown just that. He began by creating a measurement of collective versus relational social identity. Collective identification is measured by agreement to statements such as, “[My]

culture is an important reflection of who I am”, while example items for measuring relational identification state, “My happiness depends very much on the happiness of other [group members]”. He found that in both Japan and the US, collective identifications correlated negatively, while relational identification correlated positively with attitudes towards multiculturalism. However, even though Japanese participants stressed the importance of relational rather than collective social identity (again, as predicted from Brewer & Yuki, 2007; Yuki, 2003), this did not lead to more positive attitudes towards diversity on the country level. Replicating these findings would be one of the purposes of this test, as well as addressing other attitudinal factors I have mentioned in connection to the first proposed project, like the tendency for long-term versus short-term thinking. Secondly, I am interested in the connection between levels of collective and relational social identification, and the prediction of intergroup behaviours given different types of interdependence, particularly group-level interdependence.

On a brighter note, if what I have reported in Chapter 3 is correct and applicable to real-world groups, then minorities should hold more positive attitudes towards majority members and their superordinate identity the more they are aware of, and invested in, the common resource management dilemma. As I have mentioned before, the motivations for the universalist behavioural patterns of the minority observed in the thesis are unclear. This is, again, an issue onto which distinguishing collective and relational social identification might be useful, seeing how minority members’ collective identification may have spread to include the superordinate identity, accounting for the proximate reason they would not discriminate against the majority. Likewise, predictions of minority/majority behaviour in the common resource management dilemma, as well as other contexts, would

provide a compass for future investigation into peace-building within heterogeneous communities.

For this purpose, I propose an online survey based on a number of vignettes and questionnaires pertaining to predicted behaviour of different targets belonging to real-life minority / majority groups, the participants' attitudes and intended behaviour towards them, and their general attitudes and levels of understanding of different public goods.

Since all of these issues likely differ across culture, an ideal design would be cross-cultural, with representative samples from various countries. The country-selection would pay particular attention to levels of ethnic and political fractionalization within different countries, their scores on measures of cultural dimensions (particularly, individualism / collectivism, and relational mobility; Schug, Yuki, & Maddox, 2010; Yuki & Schug, 2012), and their public good policies (roughly speaking, the degree of leaning towards socialism in common goods management).

### **How Can We Live Together?**

Human societies are characterized by heterogeneity, whether in terms of ethnic and cultural background, political opinion, sexual orientation, or religious belief. Far from being a contemporary phenomenon, heterogeneity seems to have been a constant feature of our communities throughout history. Even in Neolithic times, smaller human groups, probably extended family units, shared resources with other such groups (Goncalves, Grania, Alves-Cardoso, & Carvalho, 2016). They travelled over large distances, visiting habitual shelters, exchanging goods, and occasionally building larger communities and identities (Brewer & Campbell, 1976). Even long after the hunter-gatherers settled into cities, and those cities into states, ethnic and religious diversity would be found and recognized in them (Janusek, 2004; Lightfoot, 2015; Ovesiku, 2005; Sutton, 1981). If anything, the establishment of large

urban centres of commerce, education, and business opportunity has increased ethnic, cultural, religious, and political heterogeneity of the population (Attarian, 2013; Garnsey, 1983).

In other words, groups should be used to living with other groups. After all, there was hardly a time in our history when this was not the case. Yet it would seem that our psychology is stubbornly parochial. “When in doubt, stick to your own”, remained a sound strategy for human beings despite the fact there was ample opportunity to explore a more universalist default intergroup behaviour. As our society grows, both in number, mobility, and interconnectedness, the pitfalls of parochialism are becoming increasingly obvious, and a solution for living together peacefully, ever more urgently needed.

My research indicates that certain structural characteristics of the interaction between groups can be contributors in engaging default, parochial strategies. By mapping those out, we can have a better understanding not only of how humans (on the aggregate level) are likely to behave in certain situations, but also why they behave that way. Even though the central research questions in this thesis were exclusively concerned with the emergence of conflict between minorities and majorities, I would be remiss not to address how these findings can be used to help us live together in a more cohesive yet diverse society, or at least how they point to issues we have to solve before we can create such a society.

The main finding of the thesis is that structural characteristics of the situation, and their salience, can have a profound impact on human intergroup behaviour. More concretely, I found that minority and majority dynamics can shift depending on the type of interdependence which the communities face. From previous research, we have seen that when minorities are faced with interpersonal interdependence as the only type of

interdependence functioning, they show ingroup favouritism and, by extension, intergroup bias. Majorities show less ingroup favouritism and intergroup bias in comparison. This changes, however, once the type of interdependence is moved to the level of the superordinate group. Thus, the consciousness of common resource management has an asymmetrical effect on the minority's, as opposed to the majority's, attitude towards the ingroup "other". While it creates motivations to discriminate for the majority, it seems to have the opposite effect on the minority, which suspends the intergroup bias. In other words, minorities begin behaving in a more universalist, less parochial way, when faced with the common resource management dilemma.

The first, and obvious, recommendation we can draw from these findings is that promoting the importance of common resource management among minority members can have a positive effect on the minority's treatment of the majority, and possibly also their general attitudes towards public goods, the majority, and the superordinate group they inhabit. This makes all discussions of the public goods and how they are managed a welcome part of intervention programs and media outlets. However, this holds true only for the minority. The majority's attitude to the minority seems to revert to a defensive position if they are reminded of group-level interdependence which exists between. This discrepancy means that integration policies and programs will encounter problems from the majority's side every time public goods are discussed in the media or brought up in the context of ethnic, political, religious, or cultural diversity. That is, until the trust assumed to exist within the group, and the system of bounded generalized reciprocity (interpersonal interdependence) supporting it, can spill over the subgroup borders to be shared among all member of the superordinate group. Thus, the question becomes how to introduce depersonalized trust into a heterogeneous society where the trust is delimited by subgroup

membership, rather than by the superordinate group membership. What follows is a brief, preliminary discussion on how this can be achieved.

Of course, this is a topic for a book, not a paragraph. Many such were written to exalt the importance of trust in creating a cohesive, civil society (Fukuyama, 1995; Putnam, 1995). More often than not, they suggest more mutual monitoring, better institutions to ensure cooperation, and a mutually agreed upon system of reward and punishment as the solutions. Indeed, we can posit that solving the group resource management dilemma through strong institutions would promote the superordinate identity as a relevant and real category, allowing the trust reserved for group members to spill over into it. In addition, they would alleviate specific concerns the majority seems to have about minorities, namely, their assumption minority members will cheat on common resource management.

However, there is evidence that such systems can also be detrimental to the establishment of trust (Seligman, 1997; Yamagishi & Yamagishi, 1994). Rather, institutional solutions create security, while making it harder for trust to let down roots. In a system of security, the decision-maker does not have to use any information on their interaction partner's trustworthiness. Instead, they can rely on the interaction partner's rationality. If the institutions set up a system of reward and punishment for certain behaviours, the decision-maker is secure in the belief that the interaction partner will know what is good for them. This interaction does not promote trust since the establishment of trust must engender the possibility of profit-driven and tempting betrayal. In a heterogeneous society it is, therefore, not enough to make sure minority and majority members are equally complying with the requirements of the superordinate goal, but that they are all doing it willingly, without external incentives. The risk that they do not comply must be present so that trustworthiness could be proven.

Rather than trying to establish trust in high-risk situations which can explicitly impact the whole group, like common resource management, it makes much more sense to do so in (relatively) low-risk situations, and let the effects spill over into other arenas. Stolle, Soroka and Johnston (2008) argue that trust in heterogeneous societies can be promoted by individual social ties – the weak ties Granovetter (1973) found to be so crucial to the exchange of diverse ideas, or the globalization which Buchan and colleagues (2009) showed was instrumental in reducing intergroup bias. If this is the case, than the establishment of trust across group boundaries has to begin by the promotion of interpersonal contact between group members (as per the Contact theory of reduction of intergroup prejudice; Allport, 1954), which includes the possibility of either party taking advantage of the other.

Structural incentives to enter into risky, interpersonal exchanges can help here – for example, monetary or procedural incentives for small, local businesses which collaborate across ethnic and cultural borders. Reports and discussions of such endeavours are likewise useful to normalize the idea of risky contact between minority and majority members. Thus, integrated schools, curriculums, and classes are absolutely crucial to promote intergroup friendships (Dovidio, Gaertner, & Kawakami, 2003; Paolini, Cairns, & Voci, 2004), as are opportunities for intergroup contact in public spaces (Priest, Paradies, Ferdinand, Rouhani, & Kelaher, 2014). Part of this process must include an increase in relational mobility, i.e. the ability of any individual in a society to change group membership laterally and vertically (Schug, Yuki, & Maddox, 2010). These things are already being done with more or less consistency in a good number of multicultural contexts. This not only establishes a network which is blind to traditional group



membership, but is also breaks down the old identities in favour of a reinvented, superordinate identity which is no longer monopolized by the majority.

In short, there is no magic bullet which can be used to induce trust between groups. Trust has to be established through mutual cooperation, and this, necessarily, includes mutual risk. Having said that, institutional solutions can be useful. Firstly, they can promote the establishment of sustainable interpersonal networks which bridge group boundaries. Secondly, they can promote solutions to the common resource dilemmas which are mutually agreed upon, and transparent enough to support rather than inhibit interpersonal trust.

However, supporting the establishment of weak ties between groups engenders problems of its own. As I have discussed, weak ties might be seen as endangering the ingroup-specific culture. Influx of new ideas and norms threaten the individual's ability to predict and appropriately respond to different situations, as well as their prototypicality within the group. From the literature on symbolic threat as a contributor to intergroup bias (Stephan & Stephan, 2000), we know that this can lead to conflict between the groups. I would argue that it can lead more specifically to outgroup hate, possibly even intergroup aggression, and as such cannot be put aside. Threatening the behavioural strategies shared within the group is a true threat indeed, because it can leave a part of the population unable to appropriately handle social situations. This, in turn, can lead to them withdrawing or coming into conflict with their own greater community. We are seeing just such a process now, in which alt-right religious and political groups made up (usually) of the ethnic and cultural majorities rally against any notion of multiculturalism and any group they see as promoting it.

Currently, the various minorities are often the ones clashing with the strategies for behaviour in the groups within which they exist, and losing out in this clash. A global and definitive recognition is needed that the inclusion of the minorities into the superordinate group must include one or both sides changing their behavioural strategies. These strategies can have to do with any number of contexts, from the way business is performed, to the way people construct morality. Modern politics of inclusion have trouble expressing who should change what, and in accordance to which principles. In the long run, this concern over making unjust, blanket demands of whole groups of people, which can at times challenge their cultural heritage, only causes more damage and coordination problems (Fraser, 1998). Unfortunately, to my knowledge, there is very little to be done to alleviate the fear that one's social environment is changing. To cite the anthropologist Colombijn (1994; p.18), "the least expensive decision is consensual, but attaining such a consensus is a long process". Simply, the shift has to happen over generations.

This brings me to my final point. In the discussion of how much conflict we see in the world today, we often forget how far we have come already. Intergroup conflict, along with all types of violence, has been on a decline since prehistoric times (Pinker, 2011), as has warfare between nation-states in modern times (but not between non-nation-states; Human Security Report, 2013). Superordinate identities are being refashioned to include a diversity of people and present them as prototypical (Painter, 2010; Waldzus & Mummendey, 2004). At this point, such efforts are occasionally nothing more than pretence. However, normalization of the idea that different minority groups are part of the social landscape, there to be engaged with and not feared, is slowly bearing fruit. While much more needs to be done in some parts of the world, we can say that sexual minorities, in particular, experienced a fundamental shift in acceptance over the last century,

particularly in Western democracies where they had been vilified only fifty years ago (United Nations Human Rights Council report, 2011). In addition, the shift from collectivism towards a more individualist society means that people are taught to treat others as individuals first, and members of groups second. This allows for interpersonal relationships to establish themselves with more ease, making traditional group barriers more permeable. Finally, the gradual victory of secular humanism over traditional concepts of morality and law is providing a rational rather than ideological basis for society formation (Engelhardt, 2011; Washington, 1988). This means that empathy combined with rationality are becoming guiding principles in decision-making, both supportive of less intergroup conflict and more communication, coordination, and planning.

Humans are cooperative animals deeply involved with each other's outcomes. This makes them sensitive to structural characteristics of social situations, particularly in terms of interdependence. While in intergroup contexts, a great number of social situations are interpreted as threatening or dangerous, and thus met with default, parochial strategies, there is nothing to suggest that this has to be the case. While we may expect more conflict as divisive ideas such as ethno-nationalism, fundamentalism of religion or political views, bipolarity and dogmatism of social preferences continue to be a centre of our collective attention in social discourse, they are the birthing pains of the world we hope to see. Addressing those structural characteristics which prompt our psychology to vilify one group or another, can help us address them before the conflict escalates. Humans are continually refashioning the boundaries of groups, as well as the concepts of social justice, resource management systems, and culturally acceptable behaviour. In the end, dealing with diversity is not a choice – it is a necessity, and cultural evolution will force us to a sustainable long-term solution. With each passing generation, we can expect our cultural

ideas and ideals to respond to this need to manage heterogeneity more and more effectively, rather than heterogeneity being stomped out in favour of the familiar security of the parochial.

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## **Supplementary Materials**

## Study 1

In this section, I will lay out the materials used in Study 1. This equates to Study 1 from both Chapter 3 and Chapter 4, since the data for both empirical chapters was collected simultaneously.

This study was conducted in the Jacobs University's Laboratory for Behavioural and Social Sciences (Lab III). More precisely, it was conducted in the computer labs, a series of small rooms with a single table and chair, as well as a computer. Most of the experiment was conducted on the computer. However, some additional data was gathered with pen-and-paper questionnaires.

The software used in the experiment was programmed by my father, Damir Šimunović. He received no monetary compensation for this work.

I will first give a summary of the experimental procedure for Study 1. Next, I will post each of the materials as the participants encountered them, starting with the Consent form, through the screenshot of the main experimental protocol, and ending with the pen-and-paper questionnaires. Some of the data collected using the following materials was not included into the analyses in the empirical chapters, since the findings were either extraneous, or the data itself was collected for other research projects.

## **Procedure**

### ***Participants***

Eighty-seven participants (43 female) were recruited from Jacobs University, an international, English-language university situated in Bremen, Germany, which number about 1,300 students. The mean age of participants was 20. Their cultural, ethnic and national backgrounds were varied, with Germans as the largest national group (16.05%, n = 13), followed by China, Georgia and Romania.

The experiment was conducted on campus, in the Social and Behavioural Laboratory. The lab sports several different areas meant for various types of psychological research. One wing is dedicated to the computer lab, which consists of a series of private rooms, about 2 x 4 meters in size (although this varies from room to room). The furnishings typically consist of a single chair, table and computer. The computers are connected to the Internet, although access was disabled for the duration of the experiment.

The computer rooms are not sound-proofed, meaning the participants could hear (but not understand) conversations. This was used to the benefit of the experimental design to make sure the participants heard everybody was getting the same instructions during the first half of the experiment.

### ***Procedure***

Participants were welcomed to the laboratory by an assistant. This way, the experimenter (who would be performing the analysis of the data) would not have direct contact with the participants, and thus would be unable to connect any particular participant's name or appearance to their data. The assistant was always female. This

decision was made to limit the possible cues for aggression which male assistants can sometimes elicit in other males.

Upon arriving, the participants selected an ID number at random, which they were told not to share with either the experimental assistant or any other participant. The purpose of this step was to reassure participants their subsequent roles in the experiment were not assigned to them in advance, based on their ID numbers. After this step, the participants were led to individual computer booths where a consent form and a pen waited for them. Once all the participants assembled in the laboratory, the assistant announced the beginning of the study. The participants were instructed to input their ID numbers and gender into the computer.

Importantly, the experiment was always referred to as the “study” to avoid the connotations of the word “experiment”, which may prime participants to look for deception.

A maximum of ten participants were invited to the laboratory per session. If some participants failed to show up, no confederates were used in their place, seeing how the number of participants per session did not impact the experimental design. However, if fewer than 6 people showed up for any experimental session, the experimental assistant pretended they were there, by addressing the empty rooms.

### *Embedded minimal group categorizations*

The first portion of the experiment dealt with the group membership manipulation. As a result of this manipulation, the participants would be divided into a minimal minority and majority embedded into a larger, superordinate group. Two separate tasks were used for this purpose. The first task (Dot Estimation Task) categorized participants into a Blue and Green group. In this task, the participants were told to estimate the number of blue or

green dots appearing on the screen for 5 seconds. The available answers were offered below in increments of 10 (e.g. 1 – 10, 11 – 20...). In order to continue to the next picture, the participants had to give their answers. They did this by clicking on one of the options offered underneath the picture. After they have completed the whole task, the participants were given feedback about their (superordinate) group membership. All participants were categorized into the Green group. The feedback about group membership was displayed in a header for the remainder of the experiment. The participants were told that their categorization was based on whether they were more accurate when quickly estimating green or blue dots. In addition, they were told that this division has a basis in previous research and indicates difference in cognitive and behavioural tendencies.

After the initial categorization, the participants were given a questionnaire (adapted from Grieve & Hogg, 1999) to determine to what degree they identified with the Green and Blue groups. The questionnaire was displayed on the computer. During the time it took the participants to answer the questionnaire, the assistant distributed green and blue flags, asking the participants to indicate their group membership before handing them the appropriate flag. The flag was then given to the participants, to be kept for the remainder of the experiment. The purpose of this step was to reinforce the membership in the superordinate group, and to insert a physical reminder of it into the computer booth (some participants found a place to display the flag prominently). No participant identified themselves as a member of the Blue group.

Thereupon, the second task (Embedded Figures Task) categorized the participants into a minority (20%) and majority (80%). This task faced participants with a series of images which consisted of a single, more complex figure on the left, and four, less complex figures on the right. The participants were told to match the less complex figure, to the

more complex one. In other words, they were told to indicate which of the four less complex figures is embedded into the more complex one. They were asked to finish as many such matchings as they can, during a set time period. The duration of this period was unknown to the participants. The task was discontinued after 2 minutes.

The participants' feedback on the Embedded Figures Task was announced after the 2 minutes were up, and added to the same header which proclaimed the participants' Green group membership. In the effort to avoid attaching particular values to being assigned to the majority or minority conditions, this division was expressed only numerically, as total percentage of the population. To prevent suspicion, it was implied that the division is based on accumulated previous research, instead of only the scores of people in this particular experimental session. In reality, the categorization was determined by the order of registering the ID number at the beginning of the study.

### *Individual outcome independence*

After the participants were categorized as minority and majority Green group members (MIN and MAJ conditions), the assistant presented them with a gambling task. The assistant explained that the current study seeks to test a large number of variables. For this reason, the study may be different for each participant from this point on. The wording, particularly the use of "may be different", was chosen carefully to allow for the fact that the study was actually the same for all participants.

Participants chose a folder which supposedly contained a code determining which task they will perform. Once the participants entered the code into the computer, they were given the instructions to the rest of the experiment. First, they were told that they would be paid EUR 10 for their participation. Furthermore, they were assured that their own reward will be independent of their decisions in this task, as well as the decisions of all other

participants. Thus, irrespective of what happens in the experiment from this point on, the participants would always receive EUR 10. All of these manipulations served to break down the naive expectation of reciprocity from other group members (Yamagishi, Jin, & Kiyonari, 1999), and separate the fate of the group from the fate of the individual making the decision.

### *Group-level Interdependence Manipulation*

The participants were told they would supervise a “Public Exchange Task” in which all the remaining participants (hereafter referred to as recipients) in the session would be contributing to a common good for their own group (the Green or the Blue group). In fact, there were no recipients – all the participants performed the allocation to non-existent others. Likewise, there was no common resource management occurring within the Green and Blue groups.

The participants were told that, since they would be supervising the behaviour in the “Public Exchange Task”, they should be familiarized with its content. The “Public Exchange Task” was modelled on a traditional Public Goods Game (PGG; Ledyard, 1995). The recipients supposedly had EUR 3 available for the Public Exchange task. They could choose to contribute any portion of that reward to the common pot in increments of 10 cents. What they did not contribute, they would get to keep for themselves. Once all the contributions to the common pot were made, the amount would be doubled and redistributed equally to all recipients, irrespective of how much they had contributed. It was made clear to the participants that each recipient can profit from not contributing and keeping the full EUR 3 for themselves, but that the best outcome all around is if everybody contributed the full amount.

In order to make sure the participants have read the instructions, they were given a short questionnaire to check their understanding, as well as two questions pertaining to their predictions about a) how much they would contribute to the common pot were they taking part in the PGG, and b) how much they think most members of the Green group would contribute to the common pot.

Having explained what the recipients would be doing, the participants were shown a decision-making interface which would load three randomly chosen recipients and list their group membership, minority or majority status, and ID number. The supervisors would then be given EUR 5 per recipient, and could give allocate any amount from EUR 0.1 to EUR 5 in increments of 10 cents. The participants were instructed to give at least EUR 0.1 to each recipients. Whatever they choose to allocate to the recipients would supposedly be added to the recipients' gains from the Public Exchange task. The participants were not able to keep any portion of the endowment for themselves.

Each supervisor was presented with three dummy recipients: one from the Blue group, one from the Green group minority, and one from the Green group majority. Each recipient's profile contained their group membership (Blue or Green), and their minority (20%) or majority (80%) membership (only for Green group members). Every participant thus allocated to three different targets: a Green group minority members, a Green group majority members, and Blue group member. The different recipients appeared in randomized order.

After all three allocations were completed, the participants were asked their opinions of the recipients' trustworthiness and prosociality (e.g. likelihood that they would "follow the rules, help group members, or sacrifice for the good of the group"). The participants were also asked for their predictions on how much each particular recipient



contributed in the PGG, and how much they might have contribute to the supervisor had the roles been reversed. After this, the participants were asked to fill in an attitude questionnaire containing a variety of different questions. None of these were used in this thesis since the questions either did not assist in the understanding of the central questions posed in the text, or they were part of a different project.

Once they have completed the attitude questionnaire, participants were paid. They filled in a receipt form after which the experimental assistant led them individually out of the laboratory. During this time, participants had the opportunity to ask for a debriefing. Very few participants expressed interest in being debriefed. However, those few who did were told about the full experimental design as well as (if requested) the theoretical background and central questions explored in the study. They were then asked to sign a non-disclosure agreement, since Jacobs University is a relatively small university with a body of students who mostly live on campus and, thus, any word about the purpose of the experiment could have poisoned the well.

## Materials

Consent form

Screenshots from the experiment I

ID registration

Dot Estimation Task

Social Identity Questionnaire

Gambling task code

Screenshots from the experiment II

Embedded Figures Task

Public Exchange Task Instructions

Supervision Task Instructions

Supervision Task

Post Experimental Questionnaire

Attitude Questionnaire

Perception of Group Membership Management (long version)

Social Value Orientation (ring measure)

Social Dominance Orientation

Religiosity scale

Concept of the Divine

### Consent form for Experiment in Perception and Sociality

Thank you for choosing to take part in today's experiment. This experiment is done as a series of experiments run by BIGSSS doctoral fellow, Dora Simunovic, under the patronage of the German Excellence Initiative.

The purpose of today's experiment is to **test the relationship between the human perceptual characteristics and their decision making patterns**. For this, you may be asked to perform perception tasks, fill in questionnaires and make decisions under different conditions. This experiment will not include anything that may be harmful, painful or hurtful to you.

For your time and effort, you will be awarded a monetary compensation. The maximum amount a participant may receive in the experiment is EUR 15. However, because of the nature of the experiment, the compensation may vary in amount. Some participants may receive less than others, depending on the decisions made in the experiment. The actual procedure involved in this will be explained during the experiment.

Please keep in mind that the decisions you make and the answers you give during the experiment will be kept strictly anonymous. This means that **neither your fellow participants, nor the experimenters** will be able to match your decisions and answers to you personally. Furthermore, the data from all the participants in today's experiments will not be used for commercial or promotional purposes but exclusively for scientific purposes. We ask you, therefore, that you give honest answers without fear of being judged for them later on.

Nevertheless, if you feel you do not want to take part in this experiment, or any part of it, you may call on the experimenters, and the experiment will be stopped immediately. However, in this case, it is up to the experimenter to decide whether you should be awarded any type of compensation for your participation.

If you feel unclear about any part of the experiment, either now or during the experiment itself, please feel free to call on the experimenter, and they will help you however they can.

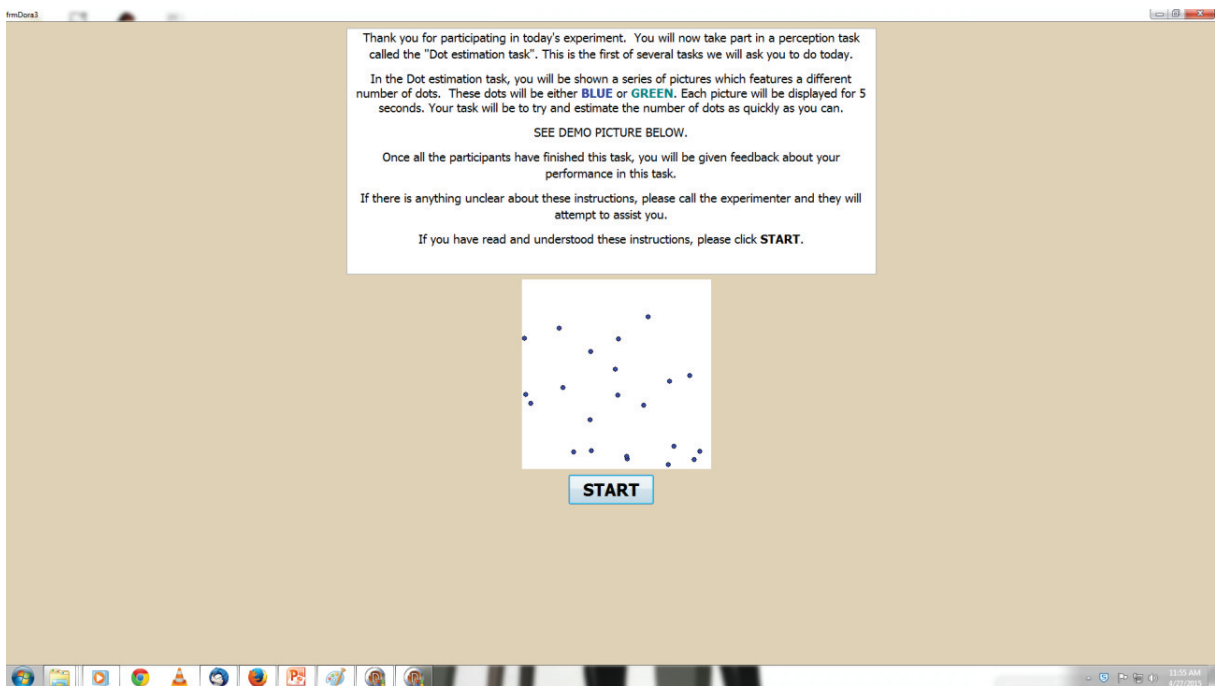
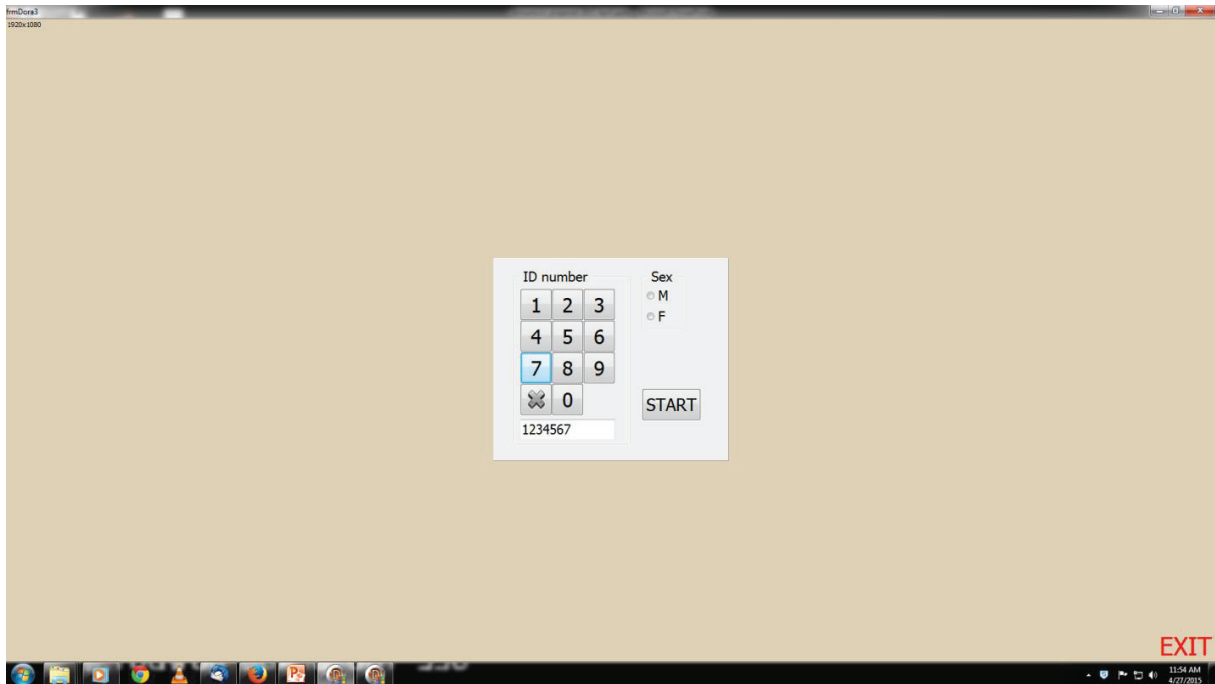
If you are willing to take part in today's experiment, **please sign your name on the line below, and write today's date**. Then fold this paper twice, and insert it into the envelope the experimenter will bring to you. This envelope will contain all the consent forms from all the participants in this experiment, and will not be emptied until the experiment is over. Therefore, the experimenter will be unable to tell who participated in this session, and who made what decision.

**I have read and understood the text above and I consent to participating in today's decision making experiment.**

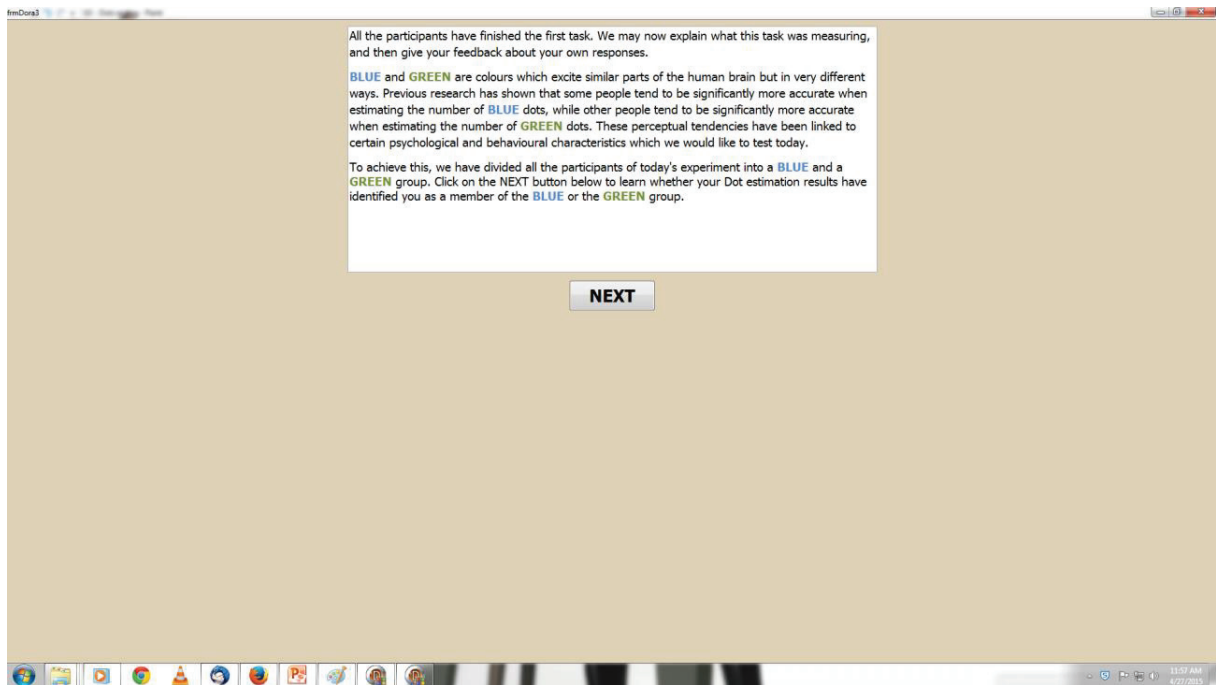
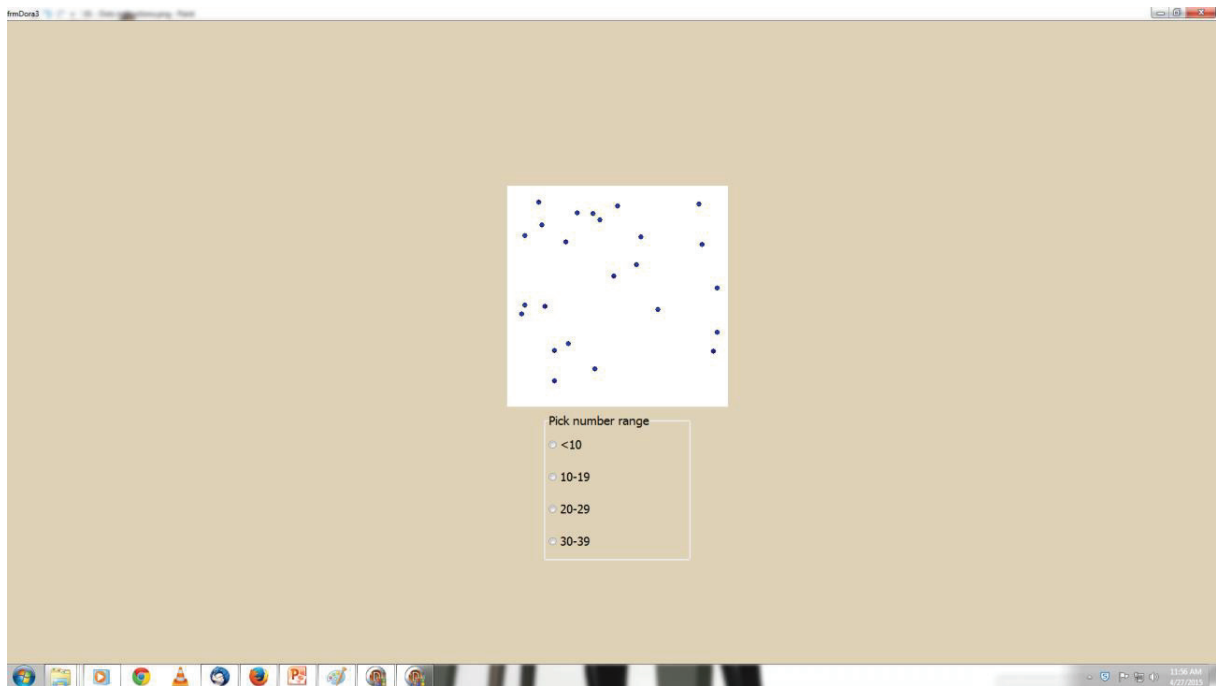
Year      Month      Day

Signed, \_\_\_\_\_

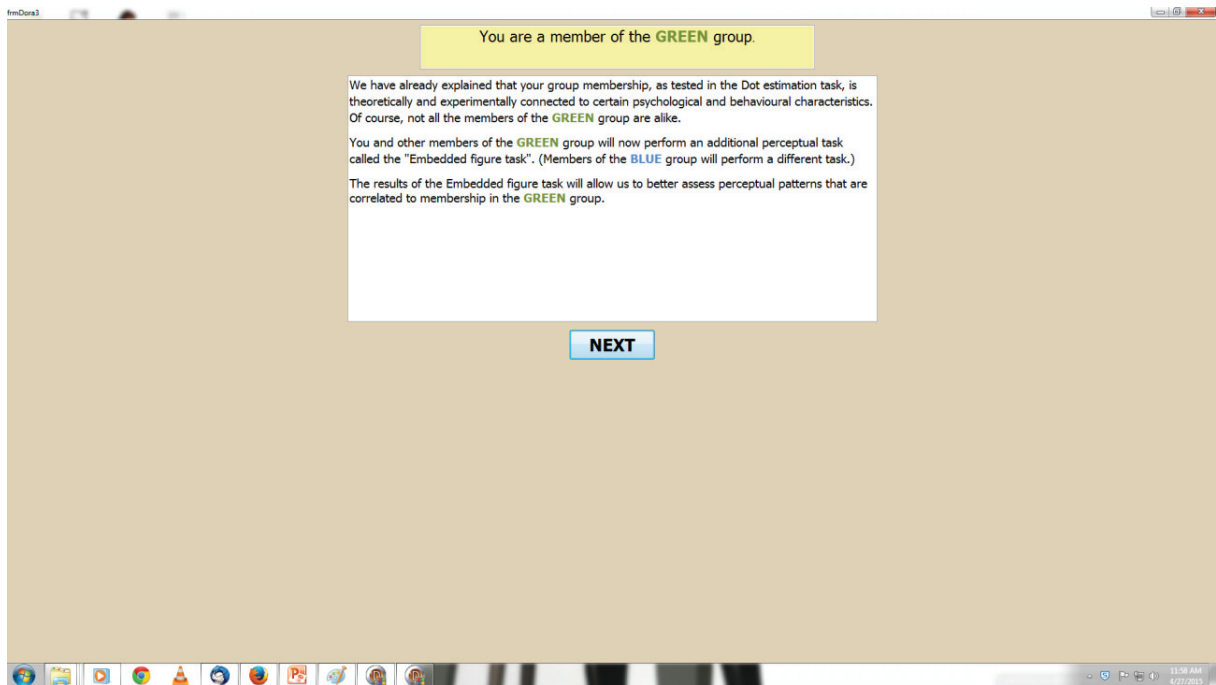
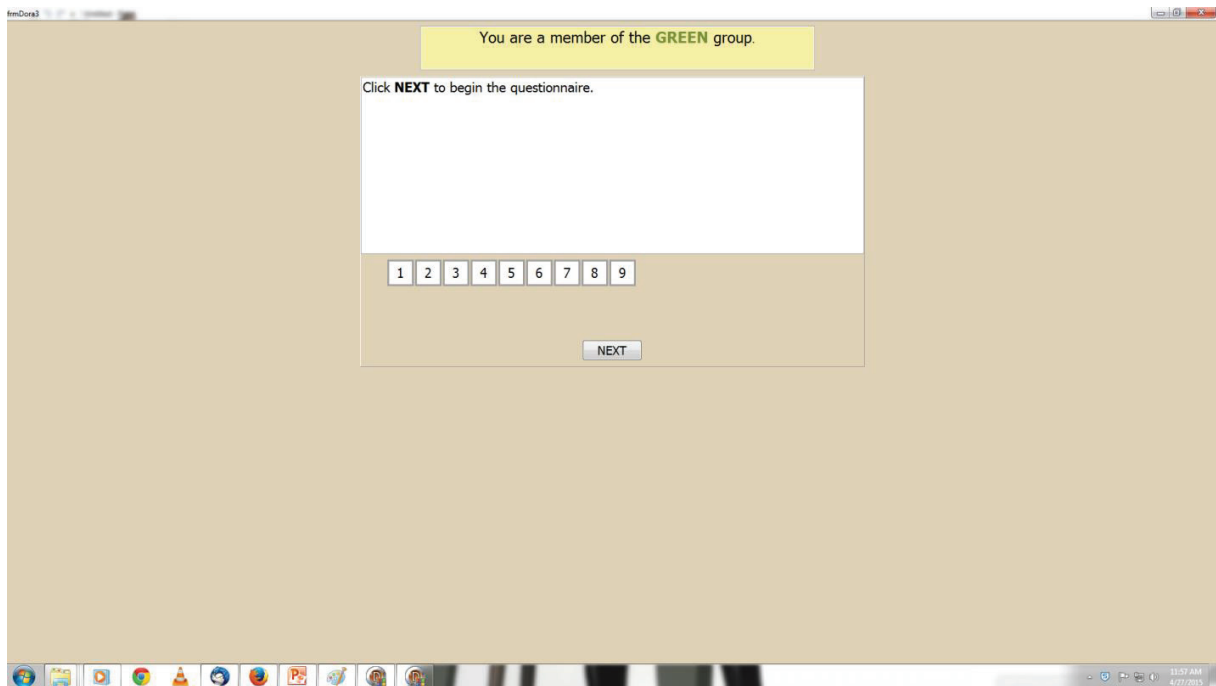
# Doctoral Dissertation: Minority versus Majority



## Doctoral Dissertation: Minority versus Majority



## Doctoral Dissertation: Minority versus Majority



# Doctoral Dissertation: Minority versus Majority

You are a member of the **GREEN** group.

The Embedded figure task is a timed perceptual test. Your task will be to compare one simple figure (X) to four other, more complex ones within a certain time frame.

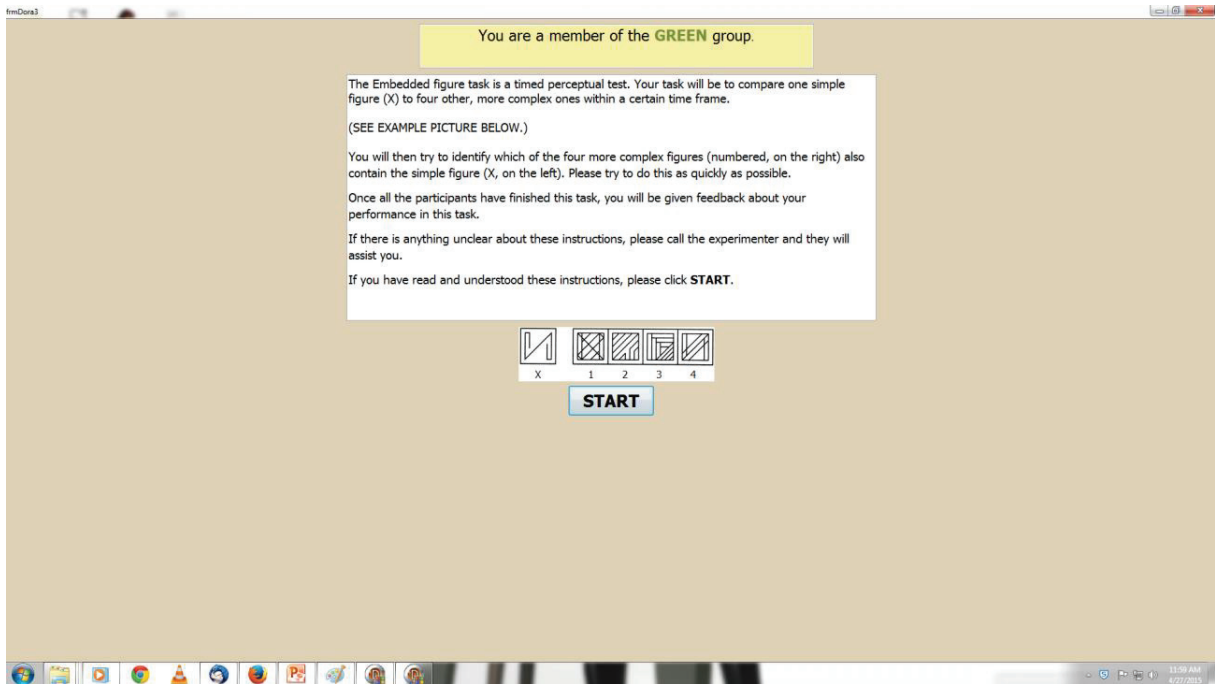
(SEE EXAMPLE PICTURE BELOW.)

You will then try to identify which of the four more complex figures (numbered, on the right) also contain the simple figure (X, on the left). Please try to do this as quickly as possible.

Once all the participants have finished this task, you will be given feedback about your performance in this task.

If there is anything unclear about these instructions, please call the experimenter and they will assist you.

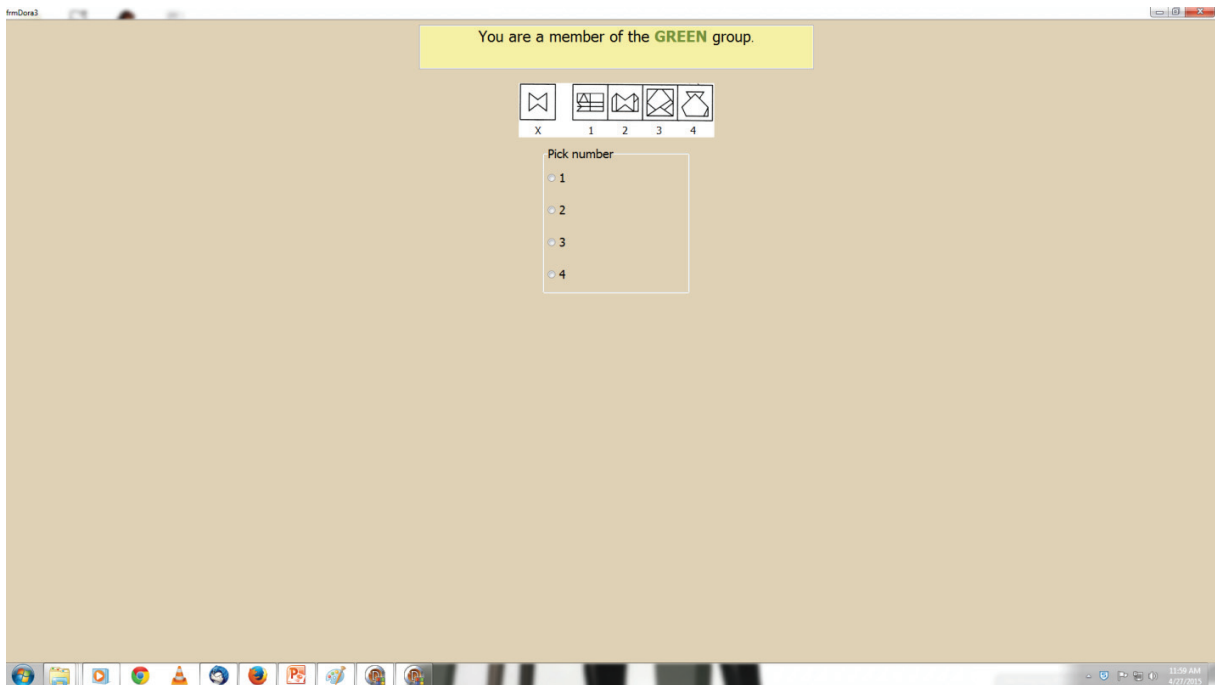
If you have read and understood these instructions, please click **START**.



X 1 2 3 4

**START**

You are a member of the **GREEN** group.

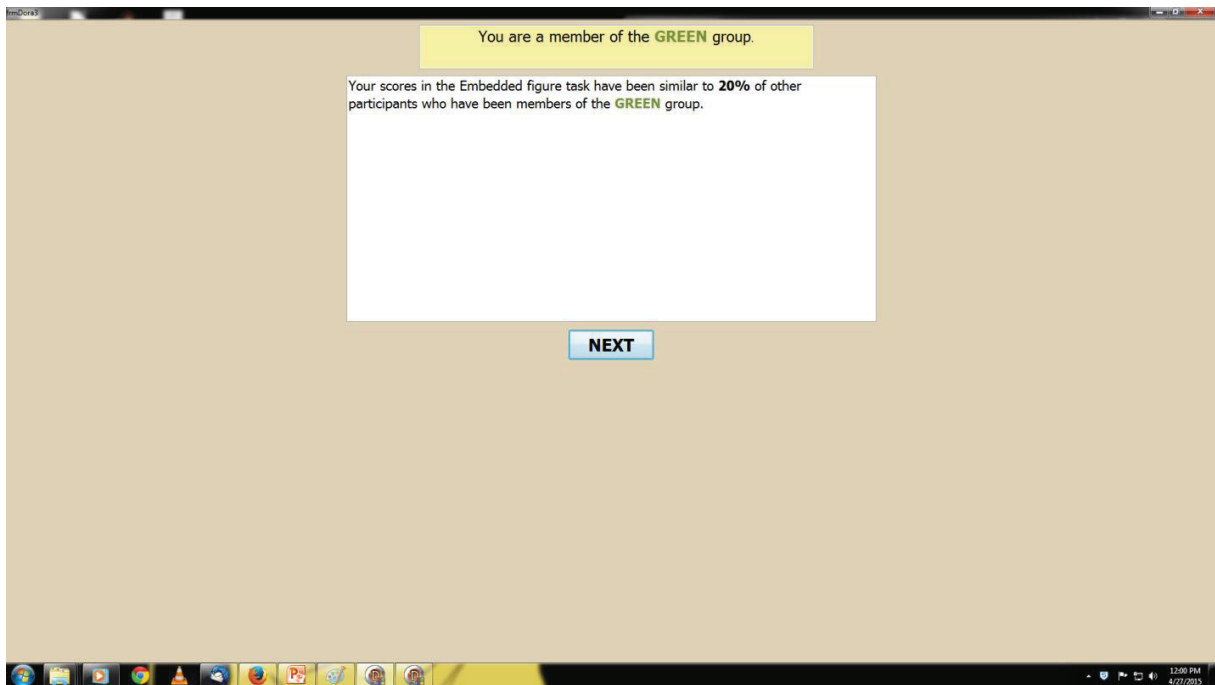
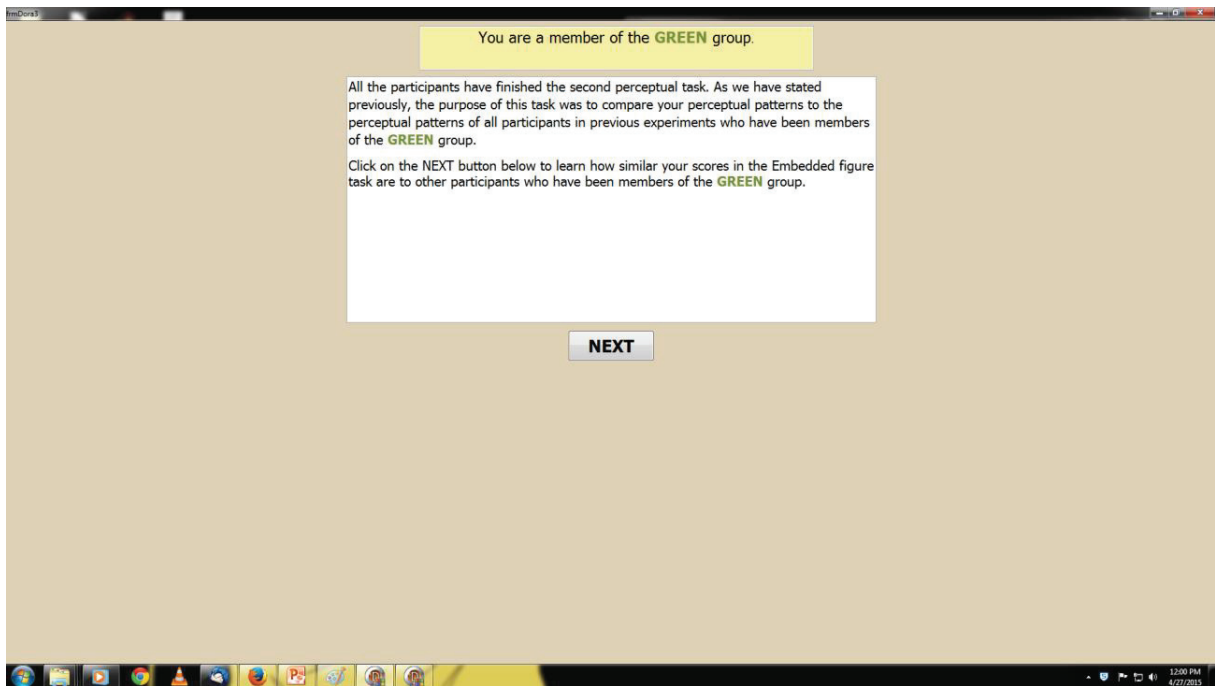


X 1 2 3 4

Pick number

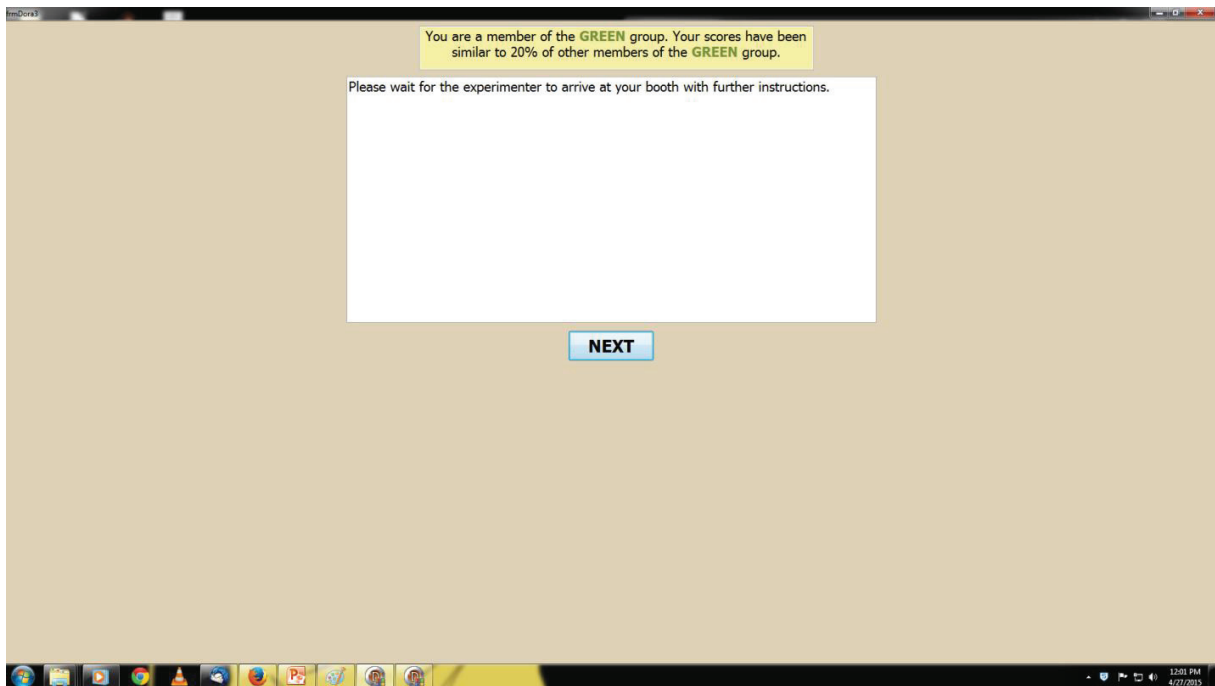
- 1
- 2
- 3
- 4

## Doctoral Dissertation: Minority versus Majority





## Doctoral Dissertation: Minority versus Majority



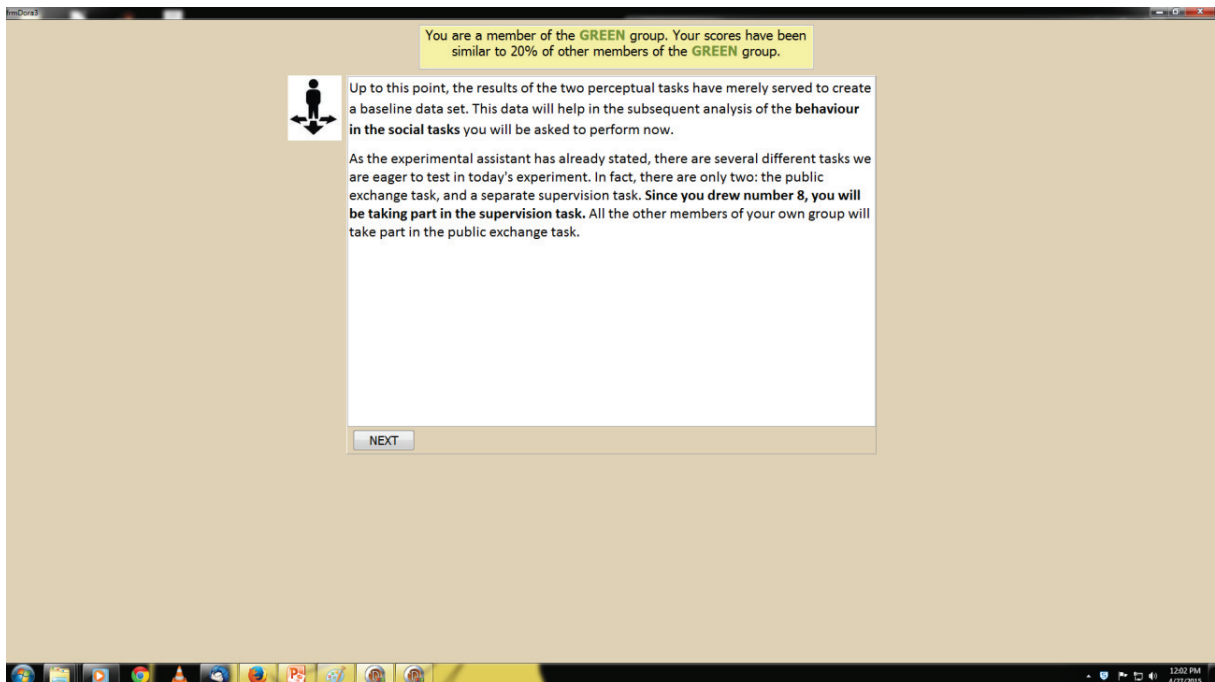
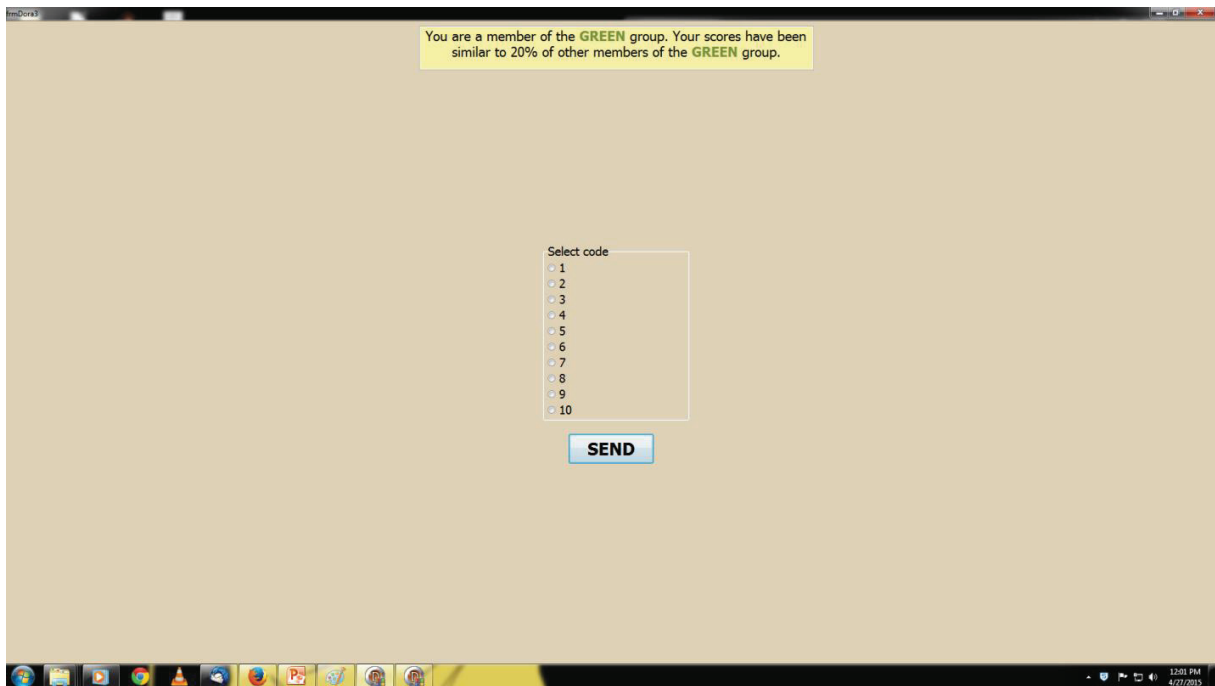
[At this point, the participants were given the lottery task. Upon choosing a folder, the participants received this message:]

Because of the large number of variables we would like to test in this experiment, the procedure for each participant will be different from this point on. In the interest of fairness, we have decided to let you choose which task you will participate in through this lottery.

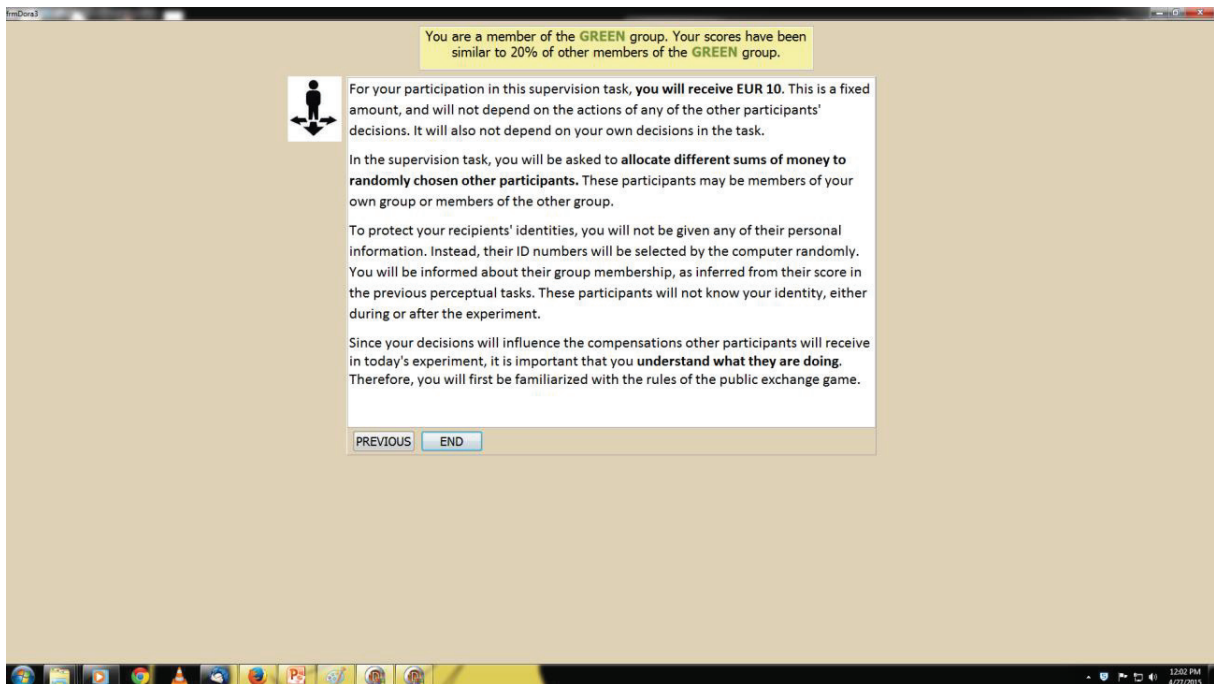
You have drawn number 8.

Please input this number into the computer to receive further instructions.


## Doctoral Dissertation: Minority versus Majority



## Doctoral Dissertation: Minority versus Majority



You are a member of the **GREEN** group. Your scores have been similar to 20% of other members of the **GREEN** group.

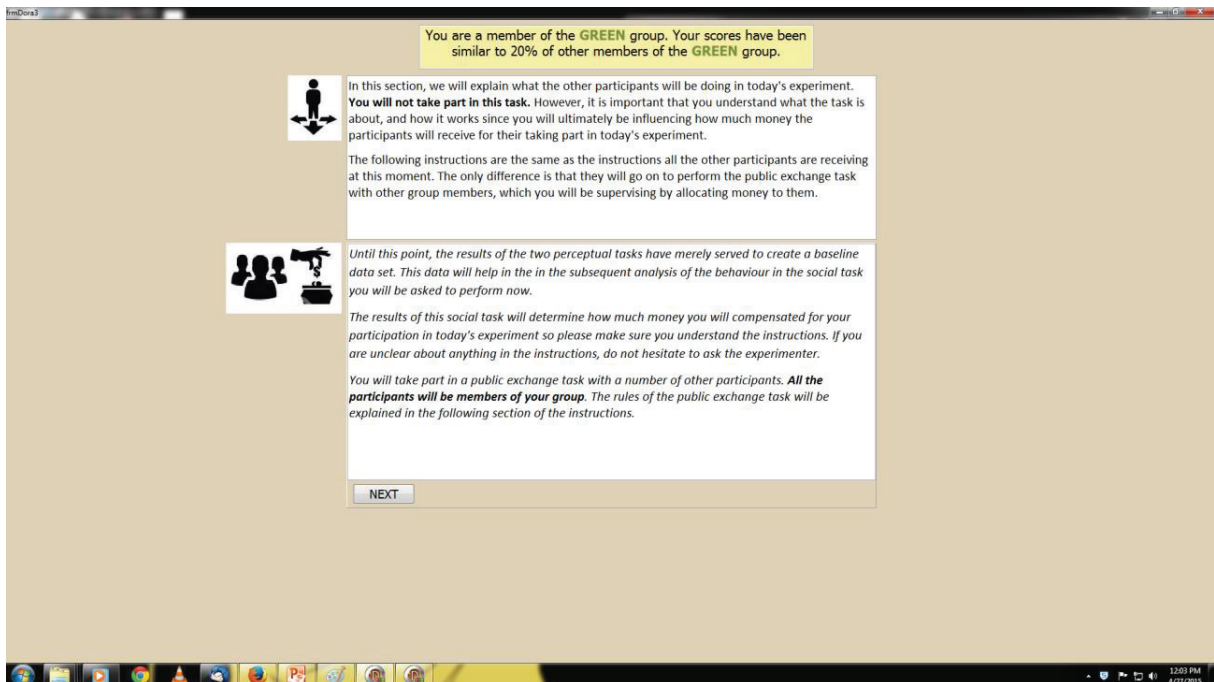
 For your participation in this supervision task, **you will receive EUR 10**. This is a fixed amount, and will not depend on the actions of any of the other participants' decisions. It will also not depend on your own decisions in the task.

In the supervision task, you will be asked to **allocate different sums of money to randomly chosen other participants**. These participants may be members of your own group or members of the other group.


To protect your recipients' identities, you will not be given any of their personal information. Instead, their ID numbers will be selected by the computer randomly. You will be informed about their group membership, as inferred from their score in the previous perceptual tasks. These participants will not know your identity, either during or after the experiment.

Since your decisions will influence the compensations other participants will receive in today's experiment, it is important that you **understand what they are doing**. Therefore, you will first be familiarized with the rules of the public exchange game.


PREVIOUS    END



You are a member of the **GREEN** group. Your scores have been similar to 20% of other members of the **GREEN** group.

 In this section, we will explain what the other participants will be doing in today's experiment. **You will not take part in this task**. However, it is important that you understand what the task is about, and how it works since you will ultimately be influencing how much money the participants will receive for their taking part in today's experiment.

The following instructions are the same as the instructions all the other participants are receiving at this moment. The only difference is that they will go on to perform the public exchange task with other group members, which you will be supervising by allocating money to them.

 *Until this point, the results of the two perceptual tasks have merely served to create a baseline data set. This data will help in the subsequent analysis of the behaviour in the social task you will be asked to perform now.*


*The results of this social task will determine how much money you will be compensated for your participation in today's experiment so please make sure you understand the instructions. If you are unclear about anything in the instructions, do not hesitate to ask the experimenter.*

*You will take part in a public exchange task with a number of other participants. **All the participants will be members of your group**. The rules of the public exchange task will be explained in the following section of the instructions.*


NEXT

## Doctoral Dissertation: Minority versus Majority

You are a member of the **GREEN** group. Your scores have been similar to 20% of other members of the **GREEN** group.

 In this section, we will explain what the other participants will be doing in today's experiment. **You will not take part in this task.** However, it is important that you understand what the task is about, and how it works since you will ultimately be influencing how much money the participants will receive for their taking part in today's experiment.

The following instructions are the same as the instructions all the other participants are receiving at this moment. The only difference is that they will go on to perform the public exchange task with other group members, which you will be supervising by allocating money to them.

 *In this public exchange task, each of the participants will be given EUR 3 by the experimenter. Your task will be to decide how much of that money to keep for yourself, and how much to contribute to a common pot in increments of 10 cents (EUR 0, EUR 0,10, EUR 0,20... EUR 2,80, EUR 2,90, EUR 3).*


**Whatever you choose to keep for yourself, will be paid out to you at the end of the experiment.** You may choose to contribute nothing to the common pot, and keep EUR 3 to yourself. You may also choose to contribute the full amount to the common pot.

*The contributions of all the participants in the public exchange task are added up by the experimenter, and doubled. After this, they are distributed equally to all the participants performing the task together, regardless of how much they had contributed to the common pot. This means that if everyone contributed the maximum amount (EUR 3) to the common pot, each participant will receive double that amount back (EUR 6).*


*In this way, how much money you receive for this stage of the experiment will depend on the decisions you make, as well as the decisions of every other participant in the public exchange task.*

PREVIOUS NEXT

You are a member of the **GREEN** group. Your scores have been similar to 20% of other members of the **GREEN** group.

 In this section, we will explain what the other participants will be doing in today's experiment. **You will not take part in this task.** However, it is important that you understand what the task is about, and how it works since you will ultimately be influencing how much money the participants will receive for their taking part in today's experiment.

The following instructions are the same as the instructions all the other participants are receiving at this moment. The only difference is that they will go on to perform the public exchange task with other group members, which you will be supervising by allocating money to them.

 *To sum up, you will participate in a public exchange task with other members of your group. Your task will be to decide how much of EUR 3 to contribute to a common pot. Each participant will face the same decision.*


*The amount of money you choose to keep is simply yours to keep. The sum which all participants in the public exchange task put in the common pool will be doubled and then split evenly amongst all of you. Each participant will get an even share no matter how much they each put into the common pot.*

*To protect your identity as well as the identities of the other players, none of you will have access to each other's personal information. Instead, **your ID and group membership**, as inferred from your score in the previous perceptual tasks, will appear on screen for the duration of the task. These participants will not know your identity, either during or after the experiment.*

PREVIOUS END

# Doctoral Dissertation: Minority versus Majority

You are a member of the GREEN group. Your scores have been similar to 20% of other members of the GREEN group.

 In this section, we will explain what the other participants will be doing in today's experiment. **You will not take part in this task.** However, it is important that you understand what the task is about, and how it works since you will ultimately be influencing how much money the participants will receive for their taking part in today's experiment.

The following instructions are the same as the instructions all the other participants are receiving at this moment. The only difference is that they will go on to perform the public exchange task with other group members, which you will be supervising by allocating money to them.

a) Members of the GREEN group will take part in the public exchange task with other members of the GREEN group. Likewise, members of the BLUE group will take part in a separate public exchange task with other members of the BLUE group.

Click answer.

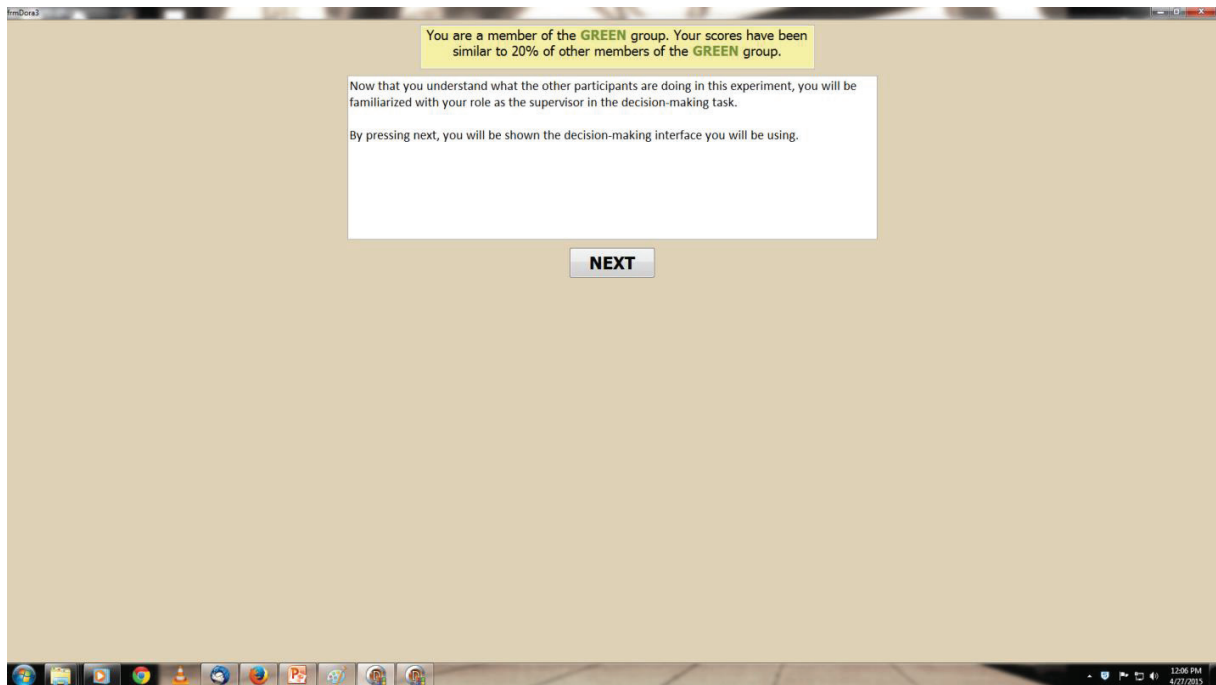
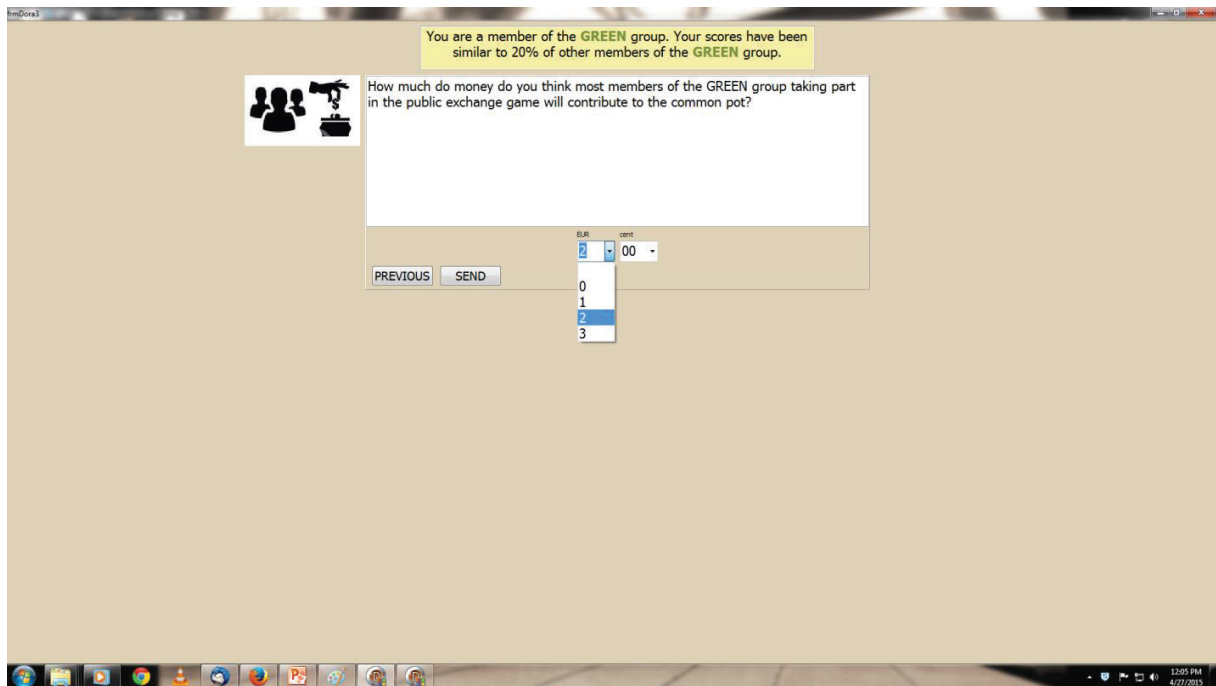
Question 1 of 5

You are a member of the GREEN group. Your scores have been similar to 20% of other members of the GREEN group.

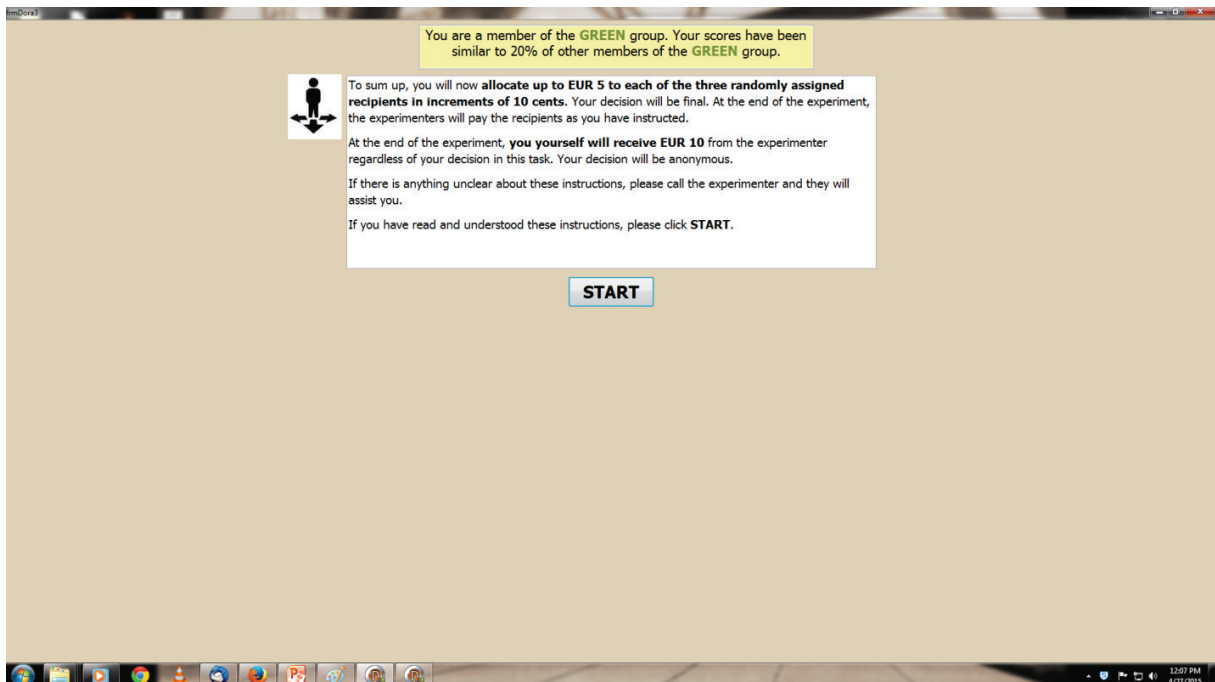
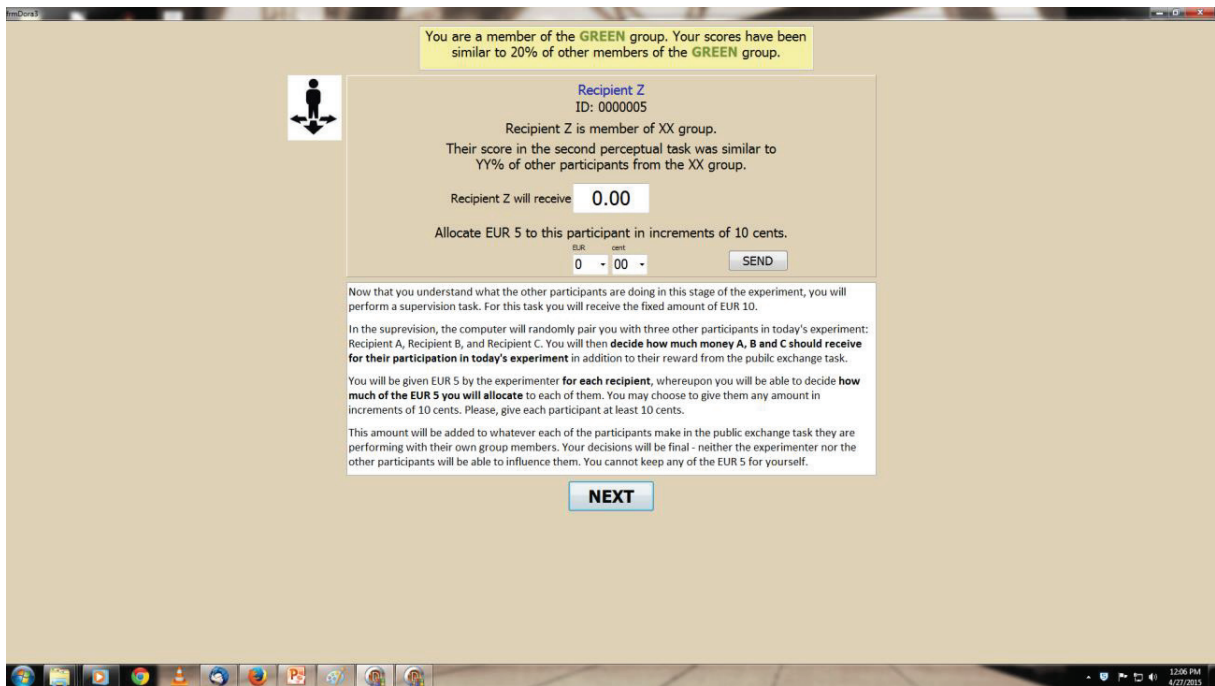
 How much money would you contribute to the common pot if you were taking part in the public exchange task?

EUR  cent

# Doctoral Dissertation: Minority versus Majority

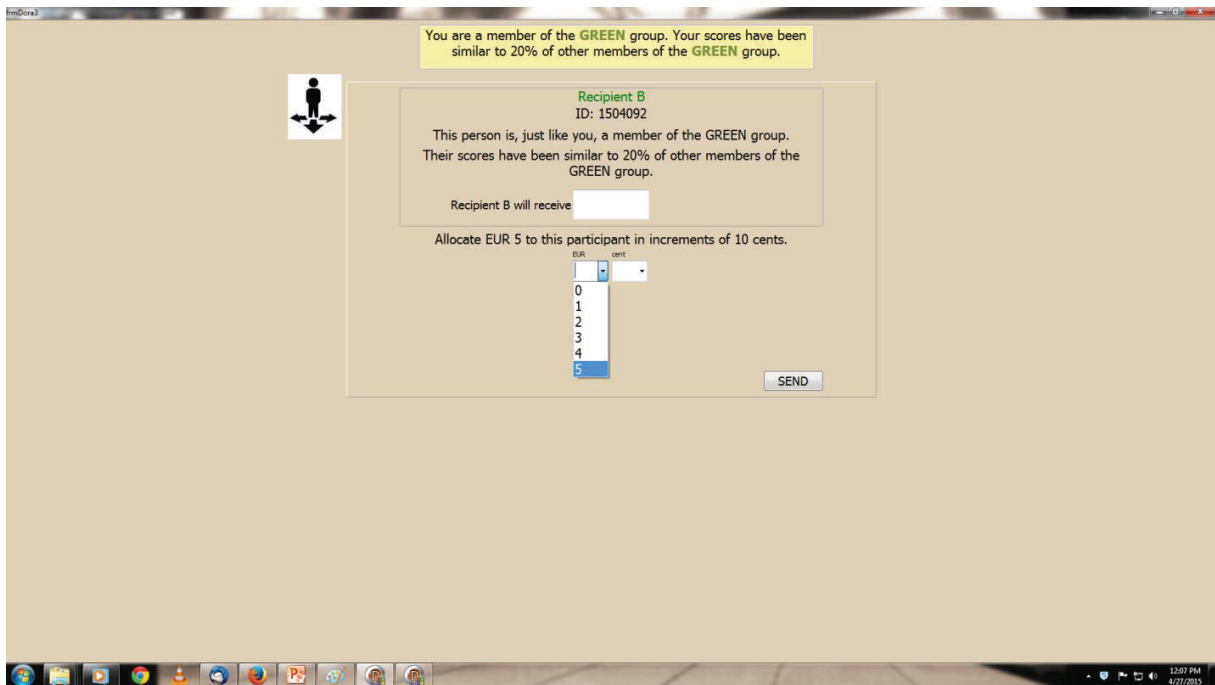
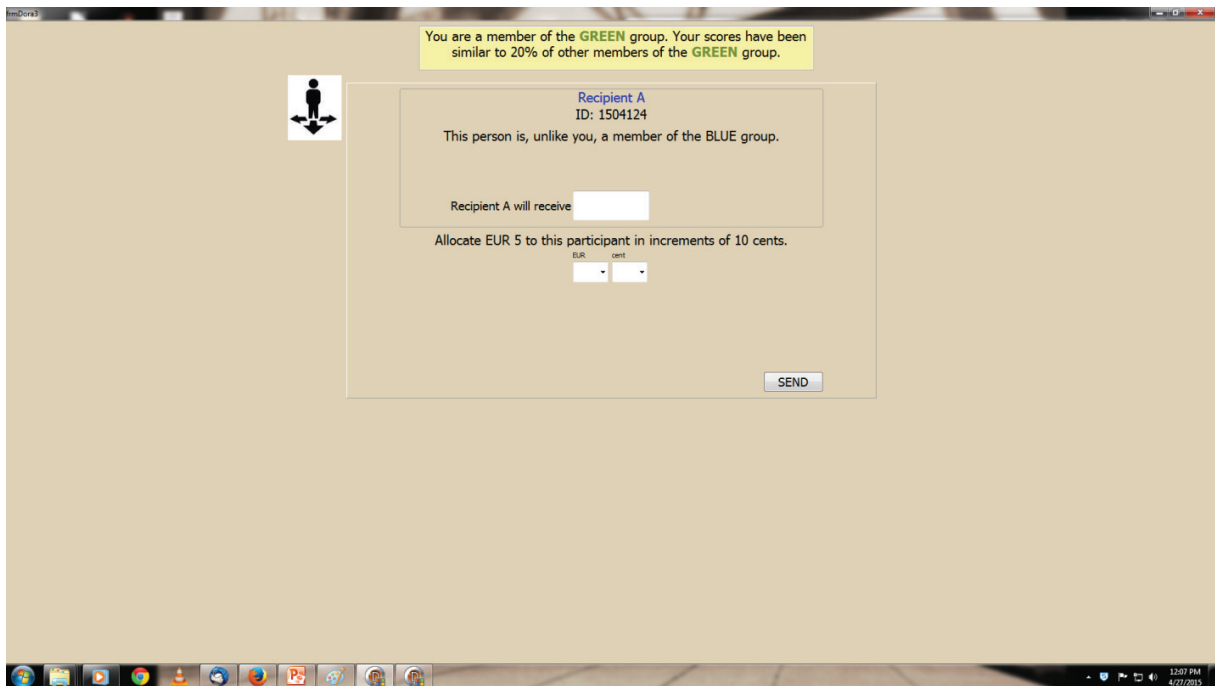


# Doctoral Dissertation: Minority versus Majority

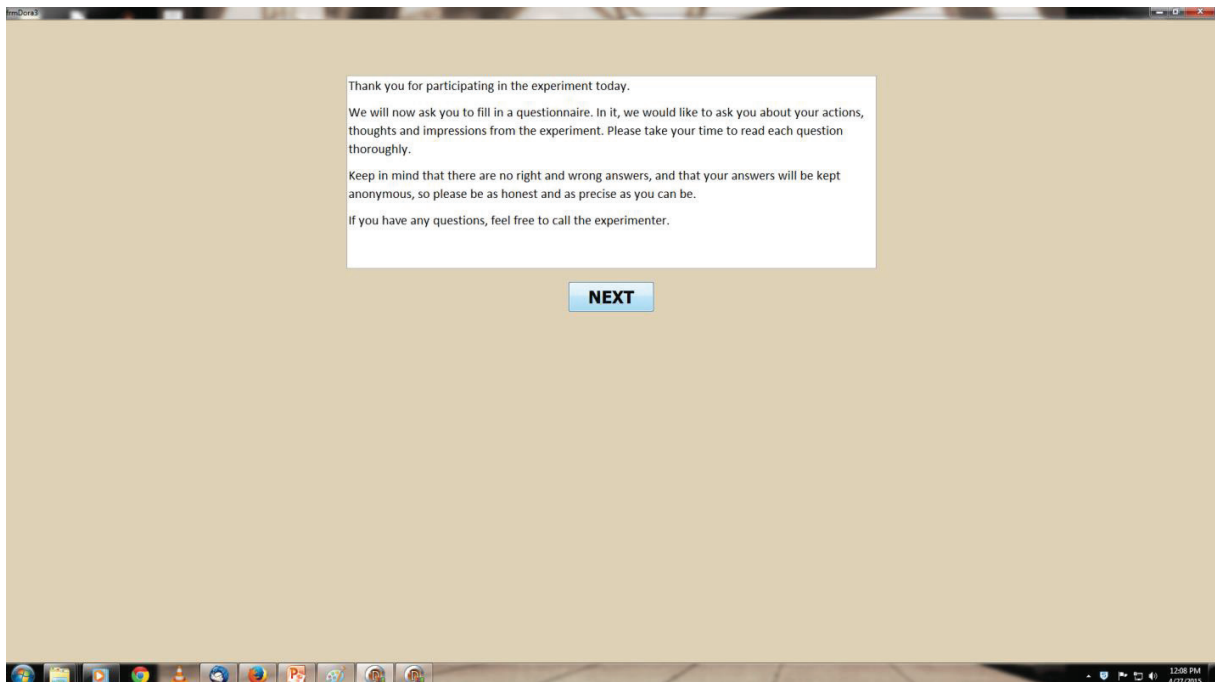
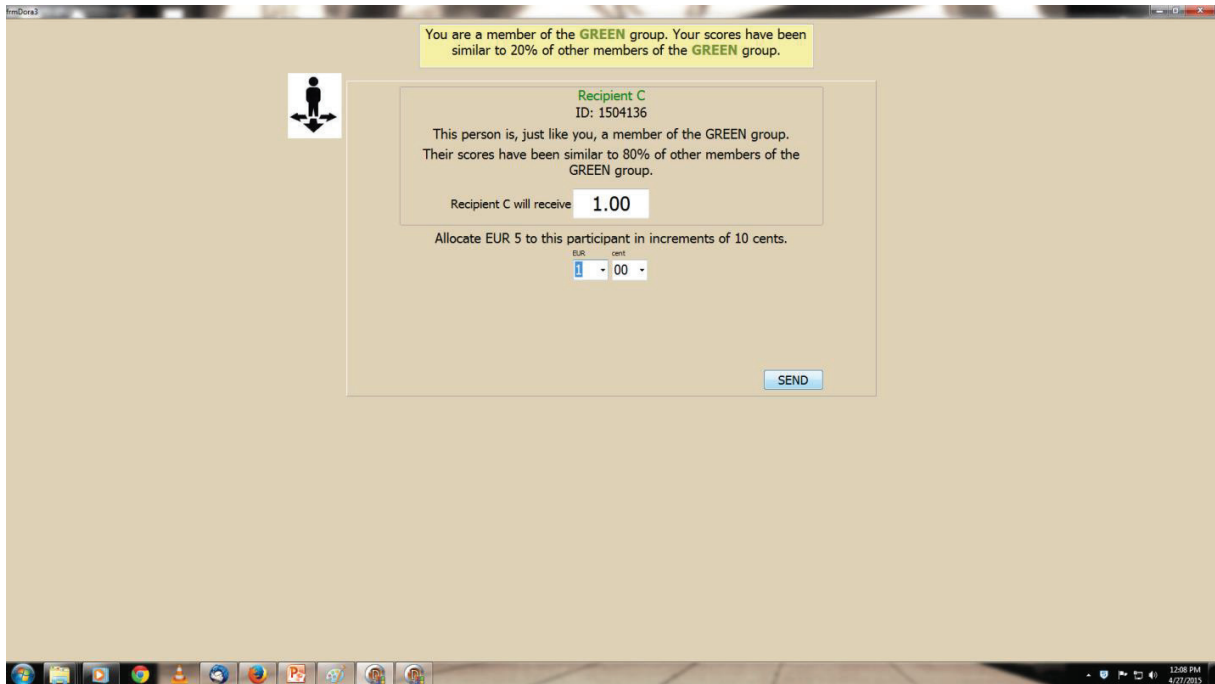




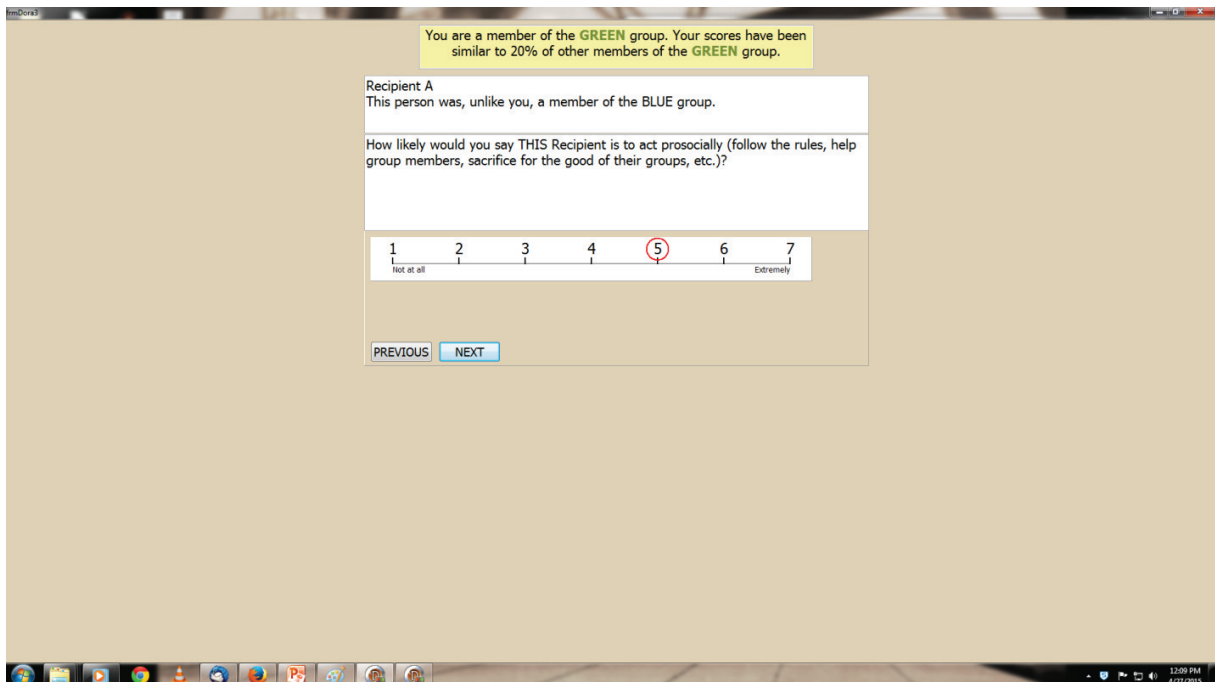
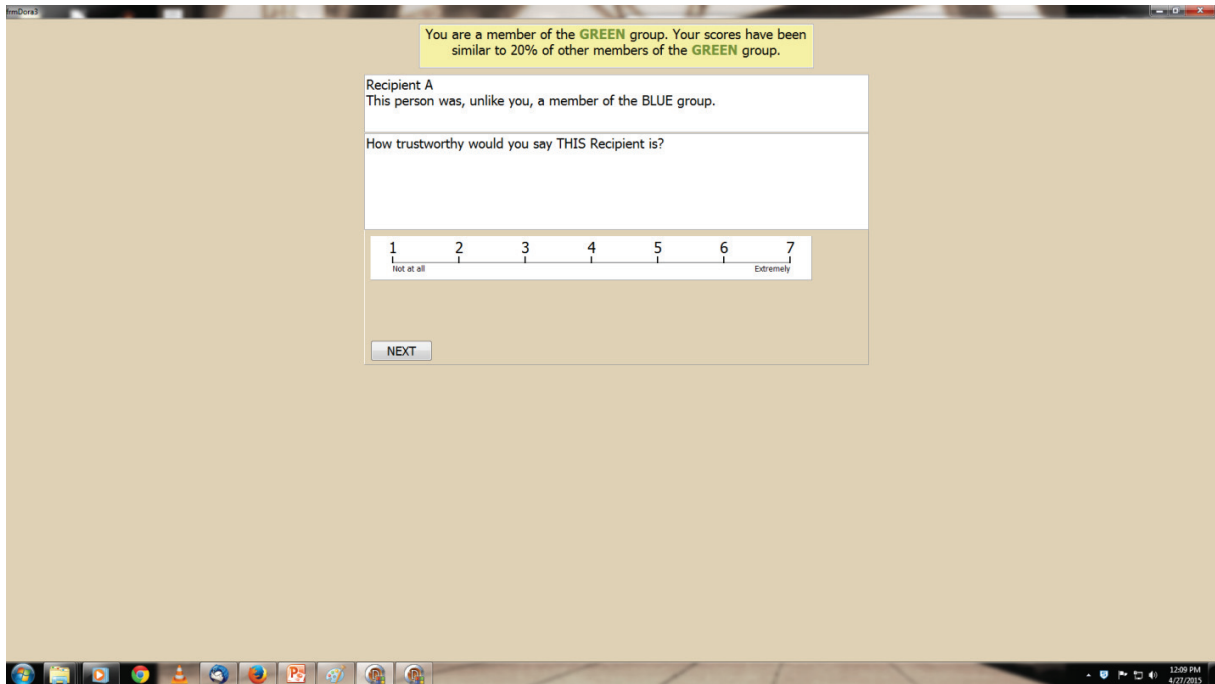
# Doctoral Dissertation: Minority versus Majority



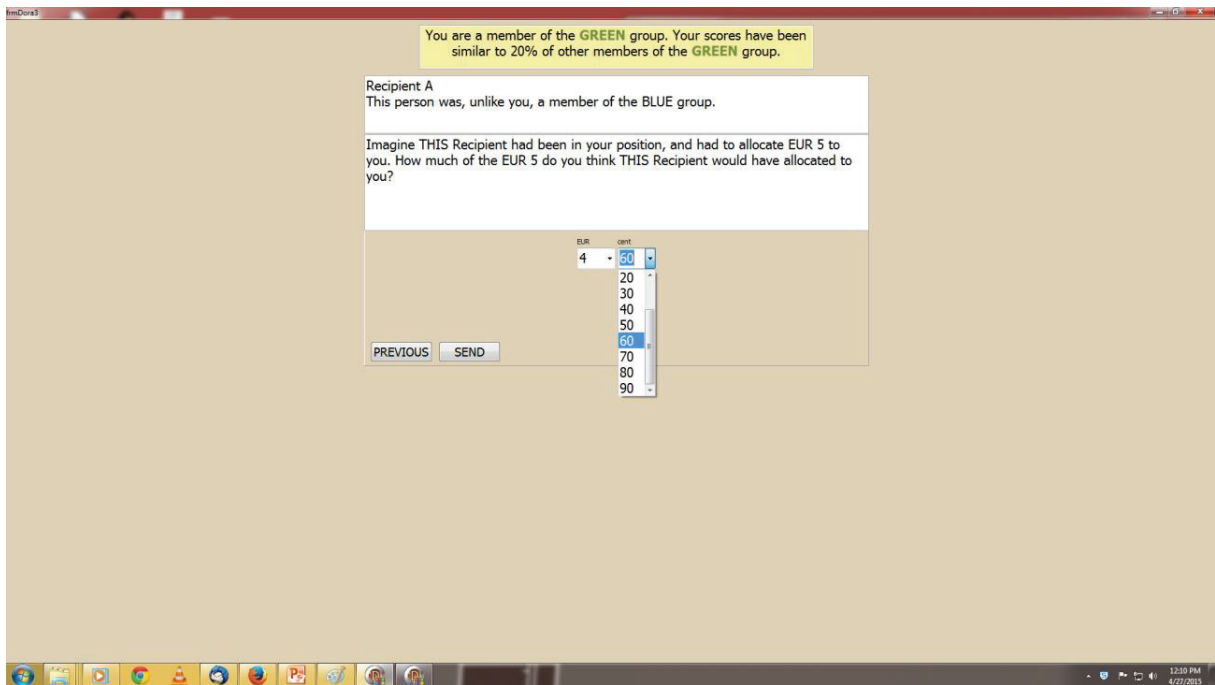
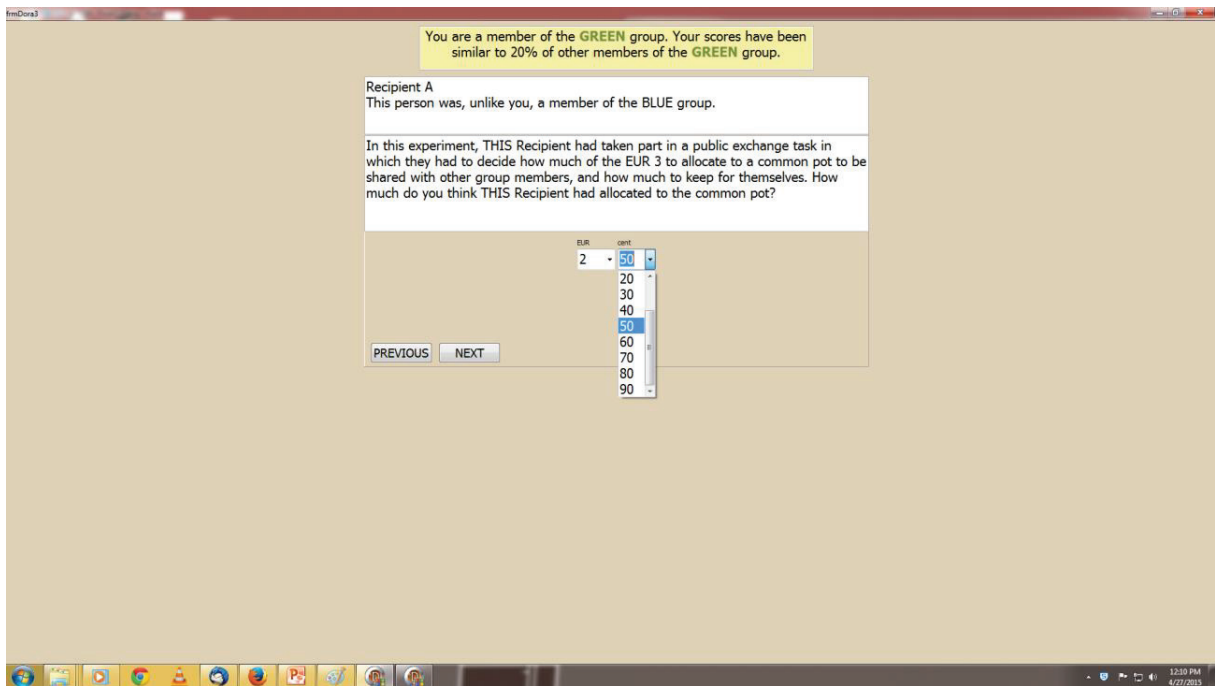
# Doctoral Dissertation: Minority versus Majority



# Doctoral Dissertation: Minority versus Majority



# Doctoral Dissertation: Minority versus Majority

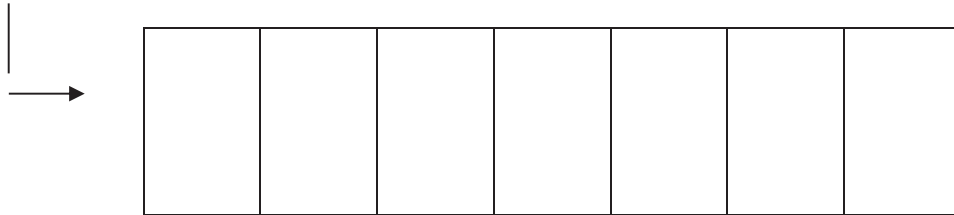


# Attitude Questionnaire



Doctoral Dissertation: Minority versus Majority

Please enter your ID number.



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**In this questionnaire, we would like to ask you about your attitudes about a variety of different topics. Please take your time to read each question thoroughly, and answer them in the order they are presented.**

**Keep in mind that there are no right and wrong answers, and that your answers will be kept anonymous, so please be honest and as precise as you can be. Nevertheless, if you feel a certain question is too intimate, feel free to skip it.**

**If you have any questions, please call the experimenter.**



In the following section of the questionnaire, we are interested in learning **your opinions about people's behaviours when interacting with members of their own group, or members of other groups**. We will ask you separately about what you believe the REALITY of these interactions are (how people actually behave), and what you believe the IDEAL state of these interactions should be (how people should behave).

We will present you with a number of statements. Please evaluate to what degree you agree with how REALISTIC each of these statements is, and then how IDEAL it is. Do this by circling the number which reflects your opinion most accurately.

In the first part of this questionnaire, we will ask you about your opinions on how people actually behave, and how they should behave, towards members of their own group.

Please take a moment to think about all the different groups, classes and social categories you belong to in everyday life (for example, your sex, your gender, your nationality, your ethnicity, your school, your sport's club, your class, etc.). Take a moment to think of as many such groups as you can. Try to recall specific interactions and situations in which group membership was important.

Keeping this in mind, please indicate to which degree you agree with the statements below. We ask you to indicate how REALISTIC each statement is, and then how IDEAL it is. Circle the number which reflects your opinion most accurately.

	REALITY			IDEAL		
People help members of their own group.	<u>12345</u>			<u>12345</u>		
	Disagree completely	Neither	Agree completely	Disagree completely	Neither	Agree completely
People scold members of their own group who did not do well in group tasks.	<u>12345</u>			<u>12345</u>		
	Disagree completely	Neither	Agree completely	Disagree completely	Neither	Agree completely
People scrutinize the behaviour of other members of their own group.	<u>12345</u>			<u>12345</u>		
	Disagree completely	Neither	Agree completely	Disagree completely	Neither	Agree completely
People return favours to other members of their own group.	<u>12345</u>			<u>12345</u>		
	Disagree completely	Neither	Agree completely	Disagree completely	Neither	Agree completely
People do not like it when members of their own groups share with other groups.	<u>12345</u>			<u>12345</u>		
	Disagree completely	Neither	Agree completely	Disagree completely	Neither	Agree completely
People get along well with members of their own group.	<u>12345</u>			<u>12345</u>		
	Disagree	Neither	Agree	Disagree	Neither	Agree

	completely		completely	completely		completely
People cooperate with members of their own group.	<u>12345</u>			<u>12345</u>		
	Disagree completely	Neither	Agree completely	Disagree completely	Neither	Agree completely
	<b>REALITY</b>			<b>IDEAL</b>		
People will punish those members of their own group who do not return favours.	<u>12345</u>			<u>12345</u>		
	Disagree completely	Neither	Agree completely	Disagree completely	Neither	Agree completely
People will punish those members of their own groups who have different opinions.	<u>12345</u>			<u>12345</u>		
	Disagree completely	Neither	Agree completely	Disagree completely	Neither	Agree completely
People never betray members of their own group.	<u>12345</u>			<u>12345</u>		
	Disagree completely	Neither	Agree completely	Disagree completely	Neither	Agree completely
People do not like it when members of their own group differentiate themselves.	<u>12345</u>			<u>12345</u>		
	Disagree completely	Neither	Agree completely	Disagree completely	Neither	Agree completely
People do not like it when members of their own group fraternize with other groups.	<u>12345</u>			<u>12345</u>		
	Disagree completely	Neither	Agree completely	Disagree completely	Neither	Agree completely
People rely on members of their own group.	<u>12345</u>			<u>12345</u>		
	Disagree completely	Neither	Agree completely	Disagree completely	Neither	Agree completely
People will distrust those members of their own groups who try to differentiate themselves.	<u>12345</u>			<u>12345</u>		
	Disagree completely	Neither	Agree completely	Disagree completely	Neither	Agree completely
People punish members of their own group who stand out.	<u>12345</u>			<u>12345</u>		
	Disagree completely	Neither	Agree completely	Disagree completely	Neither	Agree completely
People in the same group depend on each other.	<u>12345</u>			<u>12345</u>		
	Disagree completely	Neither	Agree completely	Disagree completely	Neither	Agree completely
People do favours for members of their group.	<u>12345</u>			<u>12345</u>		
	Disagree completely	Neither	Agree completely	Disagree completely	Neither	Agree completely

In the second part of this questionnaire, we will ask you about your opinions on how people actually behave, and how they should behave, towards members of a group to which they do not belong.

Please take a moment to think about all the different groups, classes and social categories you do not belong to yet encounter often in everyday life (for example, the opposite sex, another gender, a neighbour’s nationality, a neighbour’s ethnicity, a different school, a different sport’s club, a different class, etc.). Take a moment to think of as many such groups as you can. Try to recall specific interactions and situations in which group membership was important.

Keeping this in mind, please indicate to which degree you agree with the statements below. We ask you to indicate how REALISTIC each statement is, and then how IDEAL it is. Circle the number which reflects your opinion most accurately.

	REALITY			IDEAL		
People learn from members of groups other than their own.	<u>12345</u>			<u>12345</u>		
	Disagree completely	Neither	Agree completely	Disagree completely	Neither	Agree completely
People do not expect members of groups other than their own will treat them fairly.	<u>12345</u>			<u>12345</u>		
	Disagree completely	Neither	Agree completely	Disagree completely	Neither	Agree completely
People do not expect members of groups other than their own will return favours.	<u>12345</u>			<u>12345</u>		
	Disagree completely	Neither	Agree completely	Disagree completely	Neither	Agree completely
People cooperate well with members of groups other than their own.	<u>12345</u>			<u>12345</u>		
	Disagree completely	Neither	Agree completely	Disagree completely	Neither	Agree completely
People like to emulate members of groups other than their own.	<u>12345</u>			<u>12345</u>		
	Disagree completely	Neither	Agree completely	Disagree completely	Neither	Agree completely
People distrust members of groups	<u>12345</u>			<u>12345</u>		

	Disagree completely	Neither	Agree completely	Disagree completely	Neither	Agree completely
other than their own.						
People find ways in which they can work together with members of groups other than their own.		<u>12345</u>			<u>12345</u>	
	Disagree completely	Neither	Agree completely	Disagree completely	Neither	Agree completely
	<b>REALITY</b>			<b>IDEAL</b>		
People will not show gratitude to members of groups other than their own.		<u>12345</u>			<u>12345</u>	
	Disagree completely	Neither	Agree completely	Disagree completely	Neither	Agree completely
People believe that members of groups other than their own are deceitful.		<u>12345</u>			<u>12345</u>	
	Disagree completely	Neither	Agree completely	Disagree completely	Neither	Agree completely
People treat members of groups other than their own with kindness.		<u>12345</u>			<u>12345</u>	
	Disagree completely	Neither	Agree completely	Disagree completely	Neither	Agree completely
People will rarely get along well with members of groups other than their own.		<u>12345</u>			<u>12345</u>	
	Disagree completely	Neither	Agree completely	Disagree completely	Neither	Agree completely
People often discriminate against members of groups other than their own.		<u>12345</u>			<u>12345</u>	
	Disagree completely	Neither	Agree completely	Disagree completely	Neither	Agree completely
People are interested in the habits and customs of members of groups other than their own.		<u>12345</u>			<u>12345</u>	
	Disagree completely	Neither	Agree completely	Disagree completely	Neither	Agree completely
People will rarely cooperate with members of groups other than their own.		<u>12345</u>			<u>12345</u>	
	Disagree completely	Neither	Agree completely	Disagree completely	Neither	Agree completely
People believe members of groups other than their own will trick them.		<u>12345</u>			<u>12345</u>	
	Disagree completely	Neither	Agree completely	Disagree completely	Neither	Agree completely
People always try to find common ground with members of groups other than their own.		<u>12345</u>			<u>12345</u>	
	Disagree completely	Neither	Agree completely	Disagree completely	Neither	Agree completely

## What would you do?

In this part of the questionnaire, you will be presented with a number of slightly different situations in which you may choose two different outcomes, [A] and [B]. All of these situations depict an economic exchange between you and another person. In some exchanges you stand to gain a certain amount, while in others you stand to lose a certain amount.

Your task will be to choose which outcome you would prefer for each of these hypothetical exchange situations. Carefully compare [A] and [B] before circling the choice you would most likely make in real life.

Example:

Example exchange:

If you could choose only one of the following outcomes, which would it be?

(Please circle either [A] or [B].)

**A** : You would **gain** EUR , while another person **loses** EUR .

**B** : You would **gain** EUR , while another person **loses** EUR .

You will choose either [A] or [B] in a number of similar hypothetical situations.

✂ If you are unclear about any part of the instructions for this part of the questionnaire, please do not hesitate to call the experimenter, and they will answer your questions.

### Exchange 1

If you could choose only one of the following outcomes, which would it be?

(Please circle either [A] or [B].)

**A** : You would **gain** EUR , while another person **loses** EUR .

**B** : You would **gain** EUR , while another person **loses** EUR .

### Exchange 2

If you could choose only one of the following outcomes, which would it be?

(Please circle either [A] or [B].)

**A** : You would **lose** EUR , while another person **gains** EUR .

**B** : You would **lose** EUR , while another person **gains** EUR .

### Exchange 3

If you could choose only one of the following outcomes, which would it be?

(Please circle either [A] or [B].)

**A** : You would **lose** EUR , while another person **gains** EUR .

**B** : You would **lose** EUR , while another person **loses** EUR .

### Exchange 4

If you could choose only one of the following outcomes, which would it be?

(Please circle either [A] or [B].)

**A** : You would **lose** EUR , while another person **gains** EUR .

**B** : You would **lose** EUR , while another person **gains** EUR .

### Exchange 5

If you could choose only one of the following outcomes, which would it be?  
(Please circle either [A] or [B].)

**A** : You would **lose** EUR , while another person **loses** EUR .

**B** : You would **lose** EUR , while another person **loses** EUR .

### Exchange 6

If you could choose only one of the following outcomes, which would it be?  
(Please circle either [A] or [B].)

**A** : You would **gain** EUR , while another person **gains** EUR .

**B** : You would **gain** EUR , while another person **gains** EUR .



### Exchange 7

If you could choose only one of the following outcomes, which would it be?

(Please circle either [A] or [B].)

**A** : You would **gain** EUR , while another person **loses** EUR .

**B** : You would **gain** EUR , while another person **loses** EUR .

### Exchange 8

If you could choose only one of the following outcomes, which would it be?

(Please circle either [A] or [B].)

**A** : You would **lose** EUR , while another person **gains** EUR .

**B** : You would **lose** EUR , while another person **gains** EUR .

### Exchange 9

If you could choose only one of the following outcomes, which would it be?

(Please circle either [A] or [B].)

**A** : You would **gain** EUR , while another person **gains** EUR .

**B** : You would **gain** EUR , while another person **gains** EUR .

### Exchange 10

If you could choose only one of the following outcomes, which would it be?

(Please circle either [A] or [B].)

**A** : You would **lose** EUR , while another person **loses** EUR .

**B** : You would **lose** EUR , while another person **loses** EUR .

### Exchange 11

If you could choose only one of the following outcomes, which would it be?

(Please circle either [A] or [B].)

**A** : You would **lose** EUR , while another person **loses** EUR .

**B** : You would **lose** EUR , while another person **loses** EUR .

### Exchange 12

If you could choose only one of the following outcomes, which would it be?

(Please circle either [A] or [B].)

**A** : You would **lose** EUR , while another person **gains** EUR .

**B** : You would **lose** EUR , while another person **gains** EUR .

### Exchange 13

If you could choose only one of the following outcomes, which would it be?

(Please circle either [A] or [B].)

**A** : You would **gain** EUR , while another person **loses** EUR .

**B** : You would **gain** EUR , while another person **gains** EUR .

### Exchange 14

If you could choose only one of the following outcomes, which would it be?

(Please circle either [A] or [B].)

**A** : You would **lose** EUR , while another person **gains** EUR .

**B** : You would **lose** EUR , while another person **gains** EUR .

### Exchange 15

If you could choose only one of the following outcomes, which would it be?

(Please circle either [A] or [B].)

**A** : You would **gain** EUR , while another person **loses** EUR .

**B** : You would **gain** EUR , while another person **loses** EUR .

### Exchange 16

If you could choose only one of the following outcomes, which would it be?

(Please circle either [A] or [B].)

**A** : You would **lose** EUR , while another person **gains** EUR .

**B** : You would **gain** EUR , while another person **gains** EUR .

### Exchange 17

If you could choose only one of the following outcomes, which would it be?

(Please circle either [A] or [B].)

**A** : You would **gain** EUR , while another person **loses** EUR .

**B** : You would **gain** EUR , while another person **loses** EUR .

### Exchange 18

If you could choose only one of the following outcomes, which would it be?

(Please circle either [A] or [B].)

**A** : You would **gain** EUR , while another person **gains** EUR .

**B** : You would **gain** EUR , while another person **gains** EUR .

### Exchange 19

If you could choose only one of the following outcomes, which would it be?

(Please circle either [A] or [B].)

**A** : You would **gain** EUR , while another person **loses** EUR .

**B** : You would **gain** EUR , while another person **loses** EUR .

### Exchange 20

If you could choose only one of the following outcomes, which would it be?

(Please circle either [A] or [B].)

**A** : You would **gain** EUR , while another person **gains** EUR .

**B** : You would **gain** EUR , while another person **gains** EUR .

### Exchange 21

If you could choose only one of the following outcomes, which would it be?

(Please circle either [A] or [B].)

**A** : You would **gain** EUR , while another person **gains** EUR .

**B** : You would **gain** EUR , while another person **gains** EUR .

### Exchange 22

If you could choose only one of the following outcomes, which would it be?

(Please circle either [A] or [B].)

**A** : You would **lose** EUR , while another person **loses** EUR .

**B** : You would **gain** EUR , while another person **loses** EUR .

### Exchange 23

If you could choose only one of the following outcomes, which would it be?

(Please circle either [A] or [B].)

**A** : You would **lose** EUR , while another person **loses** EUR .

**B** : You would **lose** EUR , while another person **loses** EUR .

### Exchange 24

If you could choose only one of the following outcomes, which would it be?

(Please circle either [A] or [B].)

**A** : You would **gain** EUR , while another person **gains** EUR .

**B** : You would **gain** EUR , while another person **gains** EUR .

**Read the following statements and indicate to what degree do you agree or approve each of them by circling the appropriate number from 1 to 7. Please do not think too hard about the statements. Instead, give the first answer that pops into your head.**

1.	Having some groups on top really benefits everybody.	Strongly disagree/ disapprove <u>1</u> 2 3 4 5 6 7 Strongly agree/ approve
2.	No one group should dominate in society.	Strongly disagree/ disapprove <u>1</u> 2 3 4 5 6 7 Strongly agree/ approve
3.	We shouldn't try to guarantee that every group has the same quality of life.	Strongly disagree/ disapprove <u>1</u> 2 3 4 5 6 7 Strongly agree/ approve
4.	It's probably a good thing that certain groups are at the top and other groups are at the bottom.	Strongly disagree/ disapprove <u>1</u> 2 3 4 5 6 7 Strongly agree/ approve
5.	We should work to give all groups an equal chance to succeed.	Strongly disagree/ disapprove <u>1</u> 2 3 4 5 6 7 Strongly agree/ approve
6.	We should do what we can to equalize conditions for different groups.	Strongly disagree/ disapprove <u>1</u> 2 3 4 5 6 7 Strongly agree/ approve
7.	Groups at the bottom should not have to stay in their place.	Strongly disagree/ disapprove <u>1</u> 2 3 4 5 6 7 Strongly agree/ approve

Doctoral Dissertation: Minority versus Majority

8.	An ideal society requires some groups to be on top and others to be on the bottom.	Strongly disagree/ disapprove <u>1</u> 2 3 4 5 6 <u>7</u> Strongly agree/ approve
9.	It is unjust to try to make groups equal.	Strongly disagree/ disapprove <u>1</u> 2 3 4 5 6 <u>7</u> Strongly agree/ approve
10.	Group equality should be our ideal.	Strongly disagree/ disapprove <u>1</u> 2 3 4 5 6 <u>7</u> Strongly agree/ approve
11.	Some groups of people are simply inferior to other groups.	Strongly disagree/ disapprove <u>1</u> 2 3 4 5 6 <u>7</u> Strongly agree/ approve
12.	No matter how much effort it takes, we ought to strive to ensure that all groups have the same chance in life.	Strongly disagree/ disapprove <u>1</u> 2 3 4 5 6 <u>7</u> Strongly agree/ approve
13.	Group equality should not be our primary goal.	Strongly disagree/ disapprove <u>1</u> 2 3 4 5 6 <u>7</u> Strongly agree/ approve
14.	We should not push for group equality.	Strongly disagree/ disapprove <u>1</u> 2 3 4 5 6 <u>7</u> Strongly agree/ approve
15.	Groups at the bottom are just as deserving as groups at the top.	Strongly disagree/ disapprove <u>1</u> 2 3 4 5 6 <u>7</u> Strongly agree/ approve
16.	Group dominance is a poor principle.	Strongly disagree/ disapprove <u>1</u> 2 3 4 5 6 <u>7</u> Strongly agree/ approve



**In this part of the questionnaire, we would like to ask you about your religion, faith, and beliefs. Even if you do not consider yourself religious, please read each question carefully and answer them in the order they are presented.**

**Since different religions suppose different Divine influences on human life, such as God, or Gods, or Buddha, or Bodhisattva, etc. it would be very difficult to include them all in each question. Instead, we have decided to use “the Divine” as an alternative umbrella term.**

**If you find a question offensive or too intimate, feel free to skip it.**

**Would you consider yourself religious?**

Yes	Sometimes	No
-----	-----------	----

**How often do you attend religious meetings (including religious services, rituals, fellowship meetings etc.)?**

1. Never
2. Once a year or less
3. A few times a year
4. A few times a month
5. Once a week
6. More than once a week

**How often do you spend time in private religious activities, such as prayer, meditation, or the study of religious texts?**

1. Rarely or never
2. A few times a month
3. Once a week
4. Two or more times a week
5. Daily
6. More than once a day

**The following section contains a number of statements about religious belief or experiences. Please mark the extent to which each statement is true or not true for you.**

1. In my life, I experience the presence of the Divine.

<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>
Definitely not	Tends not to	Unsure	Tends to be	Definitely true		
true for me	true		true			for me

2. My religious beliefs are what really lie behind my whole approach to life.

<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>
Definitely not	Tends not to	Unsure	Tends to be	Definitely true		
true for me	true		true			for me

3. I try hard to carry my religion over into all other dealings in life.

<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>
Definitely not	Tends not to	Unsure	Tends to be	Definitely true		
true for me	true		true			for me

4. My faith involves all of my life.

<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>
Definitely not	Tends not to	Unsure	Tends to be	Definitely true		
true for me	true		true			for me

5. I refuse to let religious considerations influence my everyday affairs.

<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>
Definitely not	Tends not to	Unsure	Tends to be	Definitely true		
true for me	true		true			for me

6. Nothing is as important to me as serving the Divine as best as I know.

<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>
Definitely not	Tends not to	Unsure	Tends to be	Definitely true		
true for me	true		true			for me

7. My faith sometimes restricts my actions.

<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>
----------	----------	----------	----------	----------	----------	----------

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Definitely not    Tends not to    Unsure    Tends to be    Definitely true  
true for me            true                            true            for me

8. I try hard to carry my religion over into all my other dealings in life.

1      2      3      4      5      6      7

Definitely not    Tends not to    Unsure    Tends to be    Definitely true  
true for me            true                            true            for me

9. One should seek guidance from the Divine when making every important decision.

1      2      3      4      5      6      7

Definitely not    Tends not to    Unsure    Tends to be    Definitely true  
true for me            true                            true            for me

10. I believe there are more important things in life than religious belief.

1      2      3      4      5      6      7

Definitely not    Tends not to    Unsure    Tends to be    Definitely true  
true for me            true                            true            for me

11. It doesn't matter so much what I believe as long as I lead a moral life.

1      2      3      4      5      6      7

Definitely not    Tends not to    Unsure    Tends to be    Definitely true  
true for me            true                            true            for me

12. My faith serves to comfort me but I do not allow it to influence my relationships and life decisions.

1      2      3      4      5      6      7

Definitely not    Tends not to    Unsure    Tends to be    Definitely true  
true for me            true                            true            for me

13. My religion is an important part of my identity.

1      2      3      4      5      6      7

Definitely not    Tends not to    Unsure    Tends to be    Definitely true  
true for me            true                            true            for me

14. My religion means little to me.

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1    2    3    4    5    6    7  
Definitely not    Tends not to    Unsure    Tends to be    Definitely true  
true for me            true                            true            for me

15. I believe I can be a good person even without religion.

1    2    3    4    5    6    7  
Definitely not    Tends not to    Unsure    Tends to be    Definitely true  
true for me            true                            true            for me

Please read the following adjectives and indicate how much each trait applies to your conception of the Divine. If you consider yourself an atheist, please indicate how much you think each trait applies to the concept of the Divine in your culture.

<b>Forgiving</b>	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>
	Does not apply at all			I cannot say		Applies very much	
<b>Loving</b>	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>
	Does not apply at all			I cannot say		Applies very much	
<b>Angry</b>	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>
	Does not apply at all			I cannot say		Applies very much	
<b>Jealous</b>	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>
	Does not apply at all			I cannot say		Applies very much	
<b>Suffering</b>	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>
	Does not apply at all			I cannot say		Applies very much	
<b>Unconditional</b>	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>
	Does not apply at all			I cannot say		Applies very much	
<b>Gentle</b>	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>
	Does not apply at all			I cannot say		Applies very much	
<b>Fearsome</b>	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>
	Does not apply at all			I cannot say		Applies very much	
<b>Noble</b>	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>
	Does not apply at all			I cannot say		Applies very much	
<b>Self-sacrificing</b>	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>
	Does not apply at all			I cannot say		Applies very much	
<b>Vengeful</b>	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>
	Does not apply at all			I cannot say		Applies very much	
<b>Kind</b>	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>
	Does not apply at all			I cannot say		Applies very much	
<b>Generous</b>	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>
	Does not			I cannot say		Applies	

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	apply at all						very much
<b>Selfless</b>	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>
	Does not apply at all			I cannot say			Applies very much
<b>Terrifying</b>	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>
	Does not apply at all			I cannot say			Applies very much
<b>Harsh</b>	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>
	Does not apply at all			I cannot say			Applies very much
<b>Compassionate</b>	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>
	Does not apply at all			I cannot say			Applies very much
<b>Charitable</b>	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>
	Does not apply at all			I cannot say			Applies very much
<b>Punishing</b>	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>
	Does not apply at all			I cannot say			Applies very much
<b>Altruistic</b>	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>
	Does not apply at all			I cannot say			Applies very much
<b>Comforting</b>	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>
	Does not apply at all			I cannot say			Applies very much
<b>Purifying</b>	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>
	Does not apply at all			I cannot say			Applies very much
<b>Peaceful</b>	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>
	Does not apply at all			I cannot say			Applies very much

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Age: \_\_\_\_\_ Sex: F M

Nationality: \_\_\_\_\_

Field of study / research: \_\_\_\_\_

This concludes the Attitude Questionnaire. Please place the questionnaire into the envelope and call the experimenter to come collect it.

Thank you very much!



## Study 2

In this section, I will lay out the materials used in Study 2. This equates to Study 2 from both Chapter 3 and Chapter 4, since the data for both empirical chapters was collected simultaneously.

This study was conducted online, hosted by a free server (eu5.org). The website, as well as the entire software used in the experiment was set up, programmed, and managed by my father, Damir Šimunović. He received no monetary compensation for this work. The link to the study was distributed to participants via Academic Prolific's internal messaging system, where the participants were recruited.

I will post each of the materials as the participants encountered them. Some of the data collected using the following materials was not included into the analyses in the empirical chapters, since the findings were either extraneous, or the data itself was collected for other research projects.

## **Procedure**

### ***Participants***

Two hundred and fifty three participants (132 female) were recruited via Academic Prolific, a database of over 50,000 potential participants. Prolific has been launched in 2014 by a group of graduate students who began by recruiting other university attendees. For this reason, the sample has a higher average level of education than the general population. Researchers can screen the participants by previous approval rate or different demographic indicators, including sex, which is how the roughly equal numbers of male and female participants were recruited for this study.

Average age of the participants in the study was 30. Ages ranged from 16 to 64.

### ***Procedure***

The study was announced to the participants on the Academic Prolific website. The participants could then respond to the advertisement by registering for the study via their Prolific accounts. Once they registered, the link to the study was sent to them automatically. The link led to a website hosted by a free server, where the entire experiment was hosted (<http://dsimun.eu5.org/test1/welcome.php>). Most participants completed the study within the next two or three days.

After they input their Prolific ID and sex, the participants took part in a Dot Estimation task which split them into the Green group minority and Green group majority (in the Minority and Majority conditions, N=97), or the Green group and the Blue group (in the Interdependent, Matched, and Control conditions, N=153) (see Table 1 for an overview of all experimental conditions). The Dot Estimation task functioned as in Study 1, with the exception that the feedback in the Minority and Majority conditions contained the

additional information for minority / majority membership. In other words, in the equal-size group conditions, the feedback from the Dot Estimation task contained only the

This feedback was permanently displayed at the top of the page. After the minimal group categorization, the participants' level of identification with the Green and Blue groups was ascertained using the same questionnaire as in Study 1.

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Table 1. Overview of all experimental conditions from Study 2. The Minority and Majority conditions are discussed in Chapter 3, while the Interdependent, Matched, and Control conditions are discussed in Chapter 4.

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<b>CONDITION</b>	Relative group size	Group-level interdependence	Interpersonal interdependence	Sample size
<b>Minority</b>	20% of the Green group	YES	NO	48
<b>Majority</b>	80% of the Green group	YES	NO	49
<b>Interdependent</b>	No information	YES	NO	52
<b>Matched</b>	No information	YES (matched to group boundaries)	NO	51
<b>Control</b>	No information	NO	NO	50

---

### *Behavioural Measure*

The participants were told their task was to supervise a “Public Exchange task” which 6 international students (hereafter referred to as recipients) are performing as part of a series of studies hosted by Jacobs University. This statement constitutes deception, however, a study which would indeed run a Public Exchange task as described in the experiment, is planned.

For their participation, the participants would receive a fixed reward of GBP 7.5<sup>24</sup>. It was made clear to them that neither the experimenters, nor the other participants, nor the participant's own actions would impact this reward.

Thereafter, the participants who were not taking part in the Control condition were told they would first be familiarized with the Public Exchange task<sup>25</sup>, i.e. the Public Goods Game. In it, recipients would be given GBP 2 by the experimenters, and asked to donate any portion of that money to a common pot. The sum of all contributions to the common pot would then be doubled and redistributed to all 6 recipients equally. The instructions make it clear that it is in the interest of each person taking part in the PGG to contribute nothing, and reap the benefits of others' contributions.

In the Minority and Majority conditions, as well as in the Matched condition, it was made clear that the PGG would be taking part within the Green group. In the Interdependent condition, it was made clear that the PGG would be taking part with members of both the Green and the Blue group.

The participants were given a manipulation check to capture their understanding of the instructions. They were also asked to 1) predict the amount of money most people would contribute to the common pot, 2) indicate how much they themselves would contribute to the common pot if they were taking part in the PGG.

After this point, the Control condition and the other conditions (containing the PGG) reunite. The participants were familiarized with the decision-making interface and their

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<sup>24</sup>GBP 7.5 is not equivalent to the EUR 10 our student participants received in Study 1. The currency and amount were dictated by Academic Prolific.

<sup>25</sup> Since the author is planning to perform the PGG under just the conditions described, the allocations made by the supervisors will eventually be matched to real participants. Thus, no deception was used in this design, apart from the claim that the Dot Estimation task was indicative of psychological tendencies.

supervision task. The task consisted of two steps. First, the participants were asked to predict each recipients' contributions to the common pot (unless they were in the Control condition). Secondly, they were asked to allocate up to GBP 3 to each of the recipients. As in Study 2, they were asked to allocate at least 10 pence to each recipient. The participants could keep none of this money for themselves. After making their decisions, the participants were given a post-experimental questionnaire dealing with their understanding of the supervision task, the conceptualization of intergroup relationships, the tendency to identify with social categories, and their social dominance orientation.

## Materials

### Screenshots from the experiment

ID registration

Dot Estimation Task

Social Identity Questionnaire

Public Exchange Task Instructions

Supervision Task Instructions

Supervision Task

Perception of group membership management (short version)

Collective Self-Esteem Scale

Social Dominance Orientation

Demographic Information

## Doctoral Dissertation: Minority versus Majority

### Study in Human Perception and Sociality

This study is part of a larger research project in human perception and sociality. In it, you will be asked to make a series of decisions which might impact other participants in our studies. Your decisions will be final - the researchers will not be able to change them. Therefore, we ask you to read all the instructions carefully and thoroughly.

This research project is funded by the Bremen International Graduate School of Social Sciences and the German Excellence Initiative. If you have any questions, doubts, or comments, please contact Dora Simunovic, at [doras@bigsss-bremen.de](mailto:doras@bigsss-bremen.de).

NEXT

### Study in Human Perception and Sociality

Please, enter your gender and personal code given by Prolific.  
Check your entry. If correct, click Submit.

Personal code:

Gender:  MALE  FEMALE

Check

**WARNING:** Please, do not use your browser's back or forward button during the study. Use only the navigation buttons provided in the application (NEXT, PREVIOUS, SUBMIT, START etc.). You will see these buttons in the content area of your browser, coloured green.

If you, for any reason, have to refresh a page in the study, you will probably be asked to confirm data sent to the current page. Please, do the confirmation and proceed with the study.

If you experience serious problem with your Internet connection, or you have to restart your browser or your computer, do not continue from the page where the connection was broken. Instead, please, start from the beginning of the study since your data will probably be lost.

You will get clear instructions at the end of the study. When you reach the end, please do not start the study again. If you do so, your previous saved data will be overridden, and you will be paid only for one complete data set.

The application is NOT optimized for smartphone or other devices with low screen resolution.

# Doctoral Dissertation: Minority versus Majority

Welcome **123456789012345678900008**

Your gender is: **F (FEMALE)**  
Your code is: **123456789012345678900008**

If this is not correct, please close this tab and restart the study by clicking on the link provided by Prolific.ac.

Please, press NEXT button to proceed to the study.

NEXT

Your personal code: 123456789012345678900008

Thank you for participating in today's experiment. You will now take part in a perception task, called the Dot estimation task.

In the Dot estimation task, you will be shown a series of pictures which feature a different number of dots. These dots will either be **BLUE** or **GREEN**. Each picture will be displayed for 5 seconds. Your task will be to try and estimate the number of dots as quickly as you can. (SEE DEMO PICTURE BELOW).



1-10   11-20   21-30  
31-40

If you have read and understood these instructions, please click **START**.

START   NEXT



## Doctoral Dissertation: Minority versus Majority

Your personal code: 123456789012345678900008

Now that you have completed the Dot estimation task, we may explain what this task was measuring, and give you feedback about your own responses.

**BLUE** and **GREEN** are colours which excite similar parts of the human brain but in very different ways. Previous research has shown that some people tend to be significantly more accurate when estimating the number of **BLUE** dots, while other people tend to be significantly more accurate when estimating the number of **GREEN** dots.

Researchers have suggested that these perceptual tendencies are a result of prehistoric adaptations which have helped human ancestors to survive over the centuries. They have also been linked to certain psychological and behavioural characteristics which we would like to test today.

Click on the **NEXT** button below to learn your score on the Dot estimation task.

**NEXT**

Your personal code: 123456789012345678900008

Now that you have completed the Dot estimation task, we may explain what this task was measuring, and give you feedback about your own responses.

**BLUE** and **GREEN** are colours which excite similar parts of the human brain but in very different ways. Previous research has shown that some people tend to be significantly more accurate when estimating the number of **BLUE** dots, while other people tend to be significantly more accurate when estimating the number of **GREEN** dots.

Researchers have suggested that these perceptual tendencies are a result of prehistoric adaptations which have helped human ancestors to survive over the centuries. They have also been linked to certain psychological and behavioural characteristics which we would like to test today.

You are a member of the **GREEN** group. Your scores in the perception task have been similar to **20% of other participants who have been members of the GREEN group.**

Click on the **NEXT** button to continue.

**NEXT**

# Doctoral Dissertation: Minority versus Majority

Your personal code: 123456789012345678900008


You are a member of the **GREEN** group. Your scores in the perception task have been similar to **20%** of other participants who have been members of the **GREEN** group.


Please read the following questions carefully. Answer by clicking on the number which best reflects your attitude. There are no right or wrong answers, so try to be as honest and accurate as you can.

1.	How similar would you say you are to members of the <b>GREEN</b> group in terms of attitudes and opinions	<input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="radio"/> 5 <input type="radio"/> 6 <input type="radio"/> 7 <input type="radio"/> 8 <input type="radio"/> 9
		not at all <span style="float: right;">extremely similar</span>
2.	To what extent would you like to become friends with members of the <b>GREEN</b> group	<input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="radio"/> 5 <input type="radio"/> 6 <input type="radio"/> 7 <input type="radio"/> 8 <input type="radio"/> 9
		not at all <span style="float: right;">extremely so</span>
3.	To what extent do you feel you are connected to members of the <b>GREEN</b> group	<input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="radio"/> 5 <input type="radio"/> 6 <input type="radio"/> 7 <input type="radio"/> 8 <input type="radio"/> 9
		not at all <span style="float: right;">extremely connected</span>
4.	To what extent do you feel members of the <b>GREEN</b> group are a single unit	<input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="radio"/> 5 <input type="radio"/> 6 <input type="radio"/> 7 <input type="radio"/> 8 <input type="radio"/> 9
		not at all <span style="float: right;">extremely so</span>
5.	How important would you say members of the <b>GREEN</b> group are to you	<input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="radio"/> 5 <input type="radio"/> 6 <input type="radio"/> 7 <input type="radio"/> 8 <input type="radio"/> 9
		not at all <span style="float: right;">extremely important</span>
6.	Would you rather be a member of the <b>BLUE</b> or the <b>GREEN</b> group	<input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="radio"/> 5 <input type="radio"/> 6 <input type="radio"/> 7 <input type="radio"/> 8 <input type="radio"/> 9
		I prefer the <b>BLUE</b> group <span style="float: right;">I prefer the <b>GREEN</b> group</span>
7.	How trustworthy would you say members of the <b>GREEN</b> group are	<input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="radio"/> 5 <input type="radio"/> 6 <input type="radio"/> 7 <input type="radio"/> 8 <input type="radio"/> 9
		not at all <span style="float: right;">extremely trustworthy</span>
8.	How similar would you say you are to members of the <b>BLUE</b> group in terms of attitudes and opinions	<input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="radio"/> 5 <input type="radio"/> 6 <input type="radio"/> 7 <input type="radio"/> 8 <input type="radio"/> 9
		not at all <span style="float: right;">extremely similar</span>
9.	To what extent would you like to become friends with members of the <b>BLUE</b> group	<input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="radio"/> 5 <input type="radio"/> 6 <input type="radio"/> 7 <input type="radio"/> 8 <input type="radio"/> 9
		not at all <span style="float: right;">extremely so</span>
10.	To what extent do you feel you are connected to members of the <b>BLUE</b> group	<input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="radio"/> 5 <input type="radio"/> 6 <input type="radio"/> 7 <input type="radio"/> 8 <input type="radio"/> 9
		not at all <span style="float: right;">extremely connected</span>
11.	To what extent do you feel members of the <b>BLUE</b> group are a single unit	<input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="radio"/> 5 <input type="radio"/> 6 <input type="radio"/> 7 <input type="radio"/> 8 <input type="radio"/> 9
		not at all <span style="float: right;">extremely so</span>
12.	How important would you say members of the <b>BLUE</b> group are to you	<input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="radio"/> 5 <input type="radio"/> 6 <input type="radio"/> 7 <input type="radio"/> 8 <input type="radio"/> 9
		not at all <span style="float: right;">extremely important</span>
13.	How trustworthy would you say members of the <b>BLUE</b> group are	<input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="radio"/> 5 <input type="radio"/> 6 <input type="radio"/> 7 <input type="radio"/> 8 <input type="radio"/> 9
		not at all <span style="float: right;">extremely trustworthy</span>

Your personal code: 123456789012345678900008

You are a member of the **GREEN** group. Your scores in the perception task have been similar to **20%** of other participants who have been members of the **GREEN** group.

 Thank you for participating in this study so far. Up to this point, the perceptual task you have completed merely served as a baseline data set. This data will help in the subsequent analysis of the behaviour in the social tasks you will be asked to perform now.


 As we have already stated in the beginning, this study is only one part of our research. In fact, as you are taking part online, there is a **parallel study in our social sciences laboratories in Jacobs University**. In this parallel study, 6 international students are taking part in a public exchange task. Your role in today's study will be to act as a **supervisor for that public exchange task**.

Click on the **NEXT** button to continue.

## Doctoral Dissertation: Minority versus Majority

Your personal code: 123456789012345678900008 (N)

You are a member of the **GREEN** group. Your scores in the perception task have been similar to **20% of other participants who have been members of the GREEN group.**

 For your participation in this supervision task, **you will receive GBP 7.5.** This is a fixed amount, and will not depend on the actions of any of the other participants' decision. It will also not depend on your own decisions in the task.

In the supervision task, you will be asked to try to **predict the behaviour of our laboratory participants (hereafter, referred to as Recipients).** Subsequently, we will also ask you to **allocate money to them.** The recipients have also undertaken the Dot estimation task, and therefore may or may not have similar results as you do.


To protect the identities of your recipients, you will not be given any of their personal information. Instead, their ID numbers will be randomly selected by the computer. You will only be informed about their scores in the perceptual task. Your participants will likewise not know your identity, either during or after the experiment.

Since your decisions will influence the outcomes of the recipients, it is important that you understand what they are doing. Therefore, you will **first be familiarized with the rules of the public exchange task.**


Click on the **NEXT** button to continue.

Your personal code: 123456789012345678900008 (N)

You are a member of the **GREEN** group. Your scores in the perception task have been similar to **20% of other participants who have been members of the GREEN group.**

 In this section, we will explain what the 6 recipients taking part in the laboratory study are doing. **You will not take part in this task.** However, it is important that you understand what the task is about, and how it works, since we will ask you to predict the behaviour of the recipients. You will also impact how much money they will receive for their participation.

The following instructions are the same as the instructions the recipients are receiving. The only difference is that they will go on to perform the public exchange task, while you will go on to perform the supervision task.

 Thank you for participating in this study so far. Up to this point, the perceptual task you have completed merely served as a baseline data set. This data will help in the subsequent analysis of the behaviour in the social tasks you will be asked to perform now.


The results of this social task will determine how much money you will be compensated for your participation in today's study so please make sure you understand the instructions. If you are unclear about anything in the instructions, do not hesitate to ask the experimenter.

You will take part in a public exchange task **with the other members of your own group in today's study.** In other words, if you are a member of the **GREEN** group, you will take part in the task with other **GREEN** group members. If you are a member of the **BLUE** group, you will take part in the task with other **BLUE** group members. To protect your and the other participants' identities, you will not be given their personal information. Their ID numbers will be randomly selected by the computer. You will only be informed about their scores in the perceptual task. Your participants will likewise not know your identity, either during or after the experiment. The rules of the public exchange task will be explained in the following section of the instructions.


# Doctoral Dissertation: Minority versus Majority

Your personal code: 123456789012345678900008 (N)

You are a member of the **GREEN** group. Your scores in the perception task have been similar to **20% of other participants who have been members of the GREEN group.**

 In this section, we will explain what the 6 laboratory participants are doing. You will not take part in this task. However, it is important that you understand what the task is about, and how it works, since we will ask you to predict the behaviour of our laboratory participants. You will also impact how much money they will receive for their participation.

The following instructions are the same as the instructions our laboratory participants are receiving. The only difference is that they will go on to perform the public exchange task, while you will go on to perform the supervision task.


 In the public exchange task, each participant will be given GBP 2. Your task will be to decide how much of that money to keep for yourself, and how much to contribute to a common pot in **increments of 10 pence** (GBP 0, GBP 0.10, GBP 0.20, ..., GBP 1.80, GBP 1.90, GBP 2.00).

**Whatever you choose to keep for yourself, will be paid to you at the end of the experiment.** You may choose to contribute nothing to the common pot, and keep GBP 2 to yourself. You may also choose to contribute the full amount to the common pot.


[PREVIOUS](#) [NEXT](#)

Your personal code: 123456789012345678900008 (N)

You are a member of the **GREEN** group. Your scores in the perception task have been similar to **20% of other participants who have been members of the GREEN group.**

 In this section, we will explain what the 6 laboratory participants are doing. You will not take part in this task. However, it is important that you understand what the task is about, and how it works, since we will ask you to predict the behaviour of our laboratory participants. You will also impact how much money they will receive for their participation.

The following instructions are the same as the instructions our laboratory participants are receiving. The only difference is that they will go on to perform the public exchange task, while you will go on to perform the supervision task.

 The contributions of all the participants in the public exchange task are **added up by the experimenter, and doubled.** After this, they are **distributed equally to all the participants performing the task together**, regardless of how much they had contributed to the common pot. This means that if everyone contributed the maximum amount (GBP 2) to the common pot, each participant will receive double that amount back (GBP 4).

If one person decides not to contribute at all, the common pot will be smaller. Thus, when the amount of money in the pot is doubled and divided equally, everybody will receive a slightly smaller reward. However, the person who had not contributed will also have their GBP 2 in addition to the reward.


In this way, how much money you receive for this stage of the experiment will depend on the decisions you make, as well as the decisions of every other participant in the public exchange task.

[PREVIOUS](#) [NEXT](#)


# Doctoral Dissertation: Minority versus Majority

Your personal code: 123456789012345678900008 (N)

You are a member of the **GREEN** group. Your scores in the perception task have been similar to **20%** of other participants who have been members of the **GREEN** group.

 In this section, we will explain what the 6 laboratory participants are doing. You will not take part in this task. However, it is important that you understand what the task is about, and how it works, since we will ask you to predict the behaviour of our laboratory participants. You will also impact how much money they will receive for their participation.

The following instructions are the same as the instructions our laboratory participants are receiving. The only difference is that they will go on to perform the public exchange task, while you will go on to perform the supervision task.

 To sum up, you will participate in a public exchange task **with the other members of your own group in today's study**.


Your task will be to decide how much of GBP 2 to contribute to a common pot. Each participant will face the same decision.

The amount of money you choose to keep is simply yours to keep. The amount of money which all the participants in the public exchange task put into the common pot will be doubled and split evenly amongst all of you. Each participant will get an even share no matter how much they each put into the common pot.

To protect your identity as well as the identities of the other participants, none of you will have access to each other's personal information. Instead, **your ID number and scores in the perception task** will appear on the screen for the duration of the task. These participants will not know your identity, either during or after the experiment.

Your personal code: 123456789012345678900008 (N)

You are a member of the **GREEN** group. Your scores in the perception task have been similar to **20%** of other participants who have been members of the **GREEN** group.

 What follows is a small test to see whether you read and understood the instructions for the public exchange task, which you will be supervising.

If you would like to read the instructions once again, press INSTR.

The participants in the laboratory study will be taking part in the public exchange task only with members of their own group.	<input type="button" value="TRUE"/> <input type="button" value="FALSE"/>
Each participant in the public exchange task will decide how much money to contribute to a common pot.	<input type="button" value="TRUE"/> <input type="button" value="FALSE"/>
How much money each participant makes in the public exchange task depends only on their own contributions to the pot.	<input type="button" value="TRUE"/> <input type="button" value="FALSE"/>
The money in the common pot is doubled by the experimenter.	<input type="button" value="TRUE"/> <input type="button" value="FALSE"/>
The money in the common pot is distributed to each participant in the public exchange task depending on how much they had contributed to it.	<input type="button" value="TRUE"/> <input type="button" value="FALSE"/>
How much money would you contribute to the common pot if you were taking part in the public exchange task?	GBP: <input type="text" value="0"/> <input type="text" value="00"/>
How much money do you think most people would contribute to the common pot if they were taking part in the public exchange task?	GBP: <input type="text" value="0"/> <input type="text" value="00"/>

# Doctoral Dissertation: Minority versus Majority

Your personal code: 123456789012345678900008 (N)

You are a member of the **GREEN** group. Your scores in the perception task have been similar to **20%** of other participants who have been members of the **GREEN** group.

What follows is a small test to see whether you read and understood the instructions for the public exchange task, which you will supervising.  
If you would like to read the instructions once again, press INSTR.

The participants in the laboratory study will be taking part in the public exchange task only with members of their own group.	TRUE FALSE You have answered TRUE
Each participant in the public exchange task will decide how much money to contribute to a common pot.	TRUE FALSE You have answered FALSE
How much money each participant makes in the public exchange task depends only on their own contributions to the pot.	TRUE FALSE You have answered TRUE
The money in the common pot is doubled by the experimenter.	TRUE FALSE You have answered TRUE
The money in the common pot is distributed to each participant in the public exchange task depending on how much they had contributed to it.	TRUE FALSE You have answered FALSE
How much money would you contribute to the common pot if you were taking part in the public exchange task?	GBP 2.00 You have answered 2.00
How much money do you think most people would contribute to the common pot if they were taking part in the public exchange task?	GBP 1.00 You have answered 1.00

INSTR NEXT

Your personal code: 123456789012345678900008 (N)

You are a member of the **GREEN** group. Your scores in the perception task have been similar to **20%** of other participants who have been members of the **GREEN** group.

The participants in the laboratory study will be taking part in the public exchange task only with members of their own group.	Your answer was TRUE ✓ The correct answer is TRUE
Each participant in the public exchange task will decide how much money to contribute to a common pot.	Your answer was FALSE ✗ The correct answer is TRUE
How much money each participant makes in the public exchange task depends only on their own contributions to the pot.	Your answer was TRUE ✗ The correct answer is FALSE
The money in the common pot is doubled by the experimenter.	Your answer was TRUE ✓ The correct answer is TRUE
The money in the common pot is distributed to each participant in the public exchange task depending on how much they had contributed to it.	Your answer was FALSE ✓ The correct answer is FALSE
How much money would you contribute to the common pot if you were taking part in the public exchange task?	Your answer was 2.00
How much money do you think most people would contribute to the common pot if they were taking part in the public exchange task?	Your answer was 1.00


Click on the NEXT button to continue.

NEXT

# Doctoral Dissertation: Minority versus Majority

Your personal code: 123456789012345678900008 (N)


You are a member of the **GREEN** group. Your scores in the perception task have been similar to **20%** of other participants who have been members of the **GREEN** group.

 Now that you understand what the recipients are doing, you will be familiarized with your role as the **supervisor of the public exchange task**. Since you are a member of the **GREEN** group, **you will supervise the recipients from the GREEN group who are taking part in the public exchange task together.**

By pressing next, you will proceed to a decision-making interface just like the one you will be using.

Your personal code: 123456789012345678900008 (N)

You are a member of the **GREEN** group. Your scores in the perception task have been similar to **20%** of other participants who have been members of the **GREEN** group.



**Recipient Z**  
ID: 0000005  
Recipient Z is member of XY group  
Their scores in the perception task have been **similar to NN%** of other participants who have been members of the XY group.

How much do you think this Recipient would contribute to the common pot?  
GBP  , pence

I predict this Recipient will contribute GBP  to the common pot.

Allocate GBP 3 to this Recipient in increments of 10 pence.  
GBP  , pence

This Recipient will receive GBP


The computer will **randomly pair you with six recipients** who will take part in our laboratory study. We will call them Recipient A, B, C, D, E, and F. All the recipients will be given GBP 2 to use it in the public exchange task.  
Your task will be to **predict how much of that money each recipient will contribute to the common pot** (what the recipient does not contribute, is theirs to keep). Keep in mind that the recipients have up to GBP 2, and may contribute in increments of 10 pence.



# Doctoral Dissertation: Minority versus Majority

Your personal code: 123456789012345678900008 (N)

You are a member of the **GREEN** group. Your scores in the perception task have been similar to **20%** of other participants who have been members of the **GREEN** group.

 **Recipient Z**  
ID: 0000005  
Recipient Z is member of XY group  
Their scores in the perception task have been **similar to NN%** of other participants who have been members of the XY group.

How much do you think this Recipient would contribute to the common pot?  
GBP , pence

I predict this Recipient will contribute GBP  to the common pot.


Allocate GBP 3 to this Recipient in increments of 10 pence.  
GBP , pence

This Recipient will receive GBP

Next, you will decide how much money Recipients A, B, C, D, E, and F will receive for their participation in the study in addition to their rewards from the public exchange task. You may allocate up to GBP 3 to each recipient. You may choose to give them any amount in increments of 10 pence. Please, give each recipient at least 10 cents. This amount will be added to whatever each of the recipients make in the public exchange task. Your decisions will be final - neither the experimenter nor the recipients will be able to influence them. You cannot keep any of this money for yourself.

Your personal code: 123456789012345678900008 (N)

You are a member of the **GREEN** group. Your scores in the perception task have been similar to **20%** of other participants who have been members of the **GREEN** group.

 **Recipient Z**  
ID: 0000005  
Recipient Z is member of XY group  
Their scores in the perception task have been **similar to NN%** of other participants who have been members of the XY group.

How much do you think this Recipient would contribute to the common pot?  
GBP , pence

I predict this Recipient will contribute GBP  to the common pot.

Allocate GBP 3 to this Recipient in increments of 10 pence.  
GBP , pence

This Recipient will receive GBP

To sum up, you will first **predict how much each of six randomly assigned recipients will contribute in the public exchange task.**

Next, you will **allocate up to GBP 3 to each of six randomly assigned recipients in increments of 10 cents.** Your decision will be final, and will not impact your own payment. Your decision will be anonymous.


If you have read and understood these instructions, please click **START**.



# Doctoral Dissertation: Minority versus Majority

Your personal code: 123456789012345678900008 (N)

You are a member of the **GREEN** group. Your scores in the perception task have been similar to **20%** of other participants who have been members of the **GREEN** group.

 **Recipient A**  
ID: 1611223

This person is a member of the **GREEN** group. Their scores in the perception task have been **similar to 80% of other participants** who have been members of the **GREEN** group. This person is taking part in a public exchange task **with all the other members of their own group**.

How much do you think this Recipient would contribute to the common pot?  
GBP , pence


I predict this Recipient will contribute GBP  to the common pot.

Allocate GBP 3 to this Recipient in increments of 10 pence.  
GBP , pence

This Recipient will receive GBP

Your personal code: 123456789012345678900008 (N)

You are a member of the **GREEN** group. Your scores in the perception task have been similar to **20%** of other participants who have been members of the **GREEN** group.

 **Recipient D**  
ID: 1611025

This person is a member of the **GREEN** group. Their scores in the perception task have been **similar to 80% of other participants** who have been members of the **GREEN** group. This person is taking part in a public exchange task **with all the other members of their own group**.

How much do you think this Recipient would contribute to the common pot?  
GBP , pence

I predict this Recipient will contribute GBP  to the common pot.


Allocate GBP 3 to this Recipient in increments of 10 pence.  
GBP , pence

This Recipient will receive GBP

# Doctoral Dissertation: Minority versus Majority

Your personal code: 123456789012345678900008 (N)

You are a member of the **GREEN** group. Your scores in the perception task have been similar to **20%** of other participants who have been members of the **GREEN** group.



**Recipient E**  
ID: 1611236  
This person is a member of the **GREEN** group.  
Their scores in the perception task have been **similar to 20% of other participants** who have been members of the **GREEN** group. This person is taking part in a public exchange task **with all the other members of their own group**.

How much do you think this Recipient would contribute to the common pot?  
GBP  , pence

I predict this Recipient will contribute GBP  to the common pot.

Allocate GBP 3 to this Recipient in increments of 10 pence.  
GBP  , pence

This Recipient   
  
  
 receive GBP

Your personal code: 123456789012345678900008

The following questions concern your understanding of the study. Please answer the following questions as correctly as you can.

According to the Dot Estimation task, I was a member of the  
 BLUE  GREEN group.

My scores were similar to  
 20%  80% of other participants who had been members of my group.

My task in today's study was to allocate money to recipients who take part in the public exchange task in the laboratory.  
 TRUE  FALSE

How much money I made in today's study depended on the decisions other participants made.  
 TRUE  FALSE

If I gave more money to one recipient, I would have to give less money to another recipient.  
 TRUE  FALSE

The recipients would not be told who I am after the study.  
 TRUE  FALSE

## Doctoral Dissertation: Minority versus Majority

Your personal code: 123456789012345678900008

In the following section of the questionnaire, we are interested in learning **your opinions about people's behaviours when interacting with members of their own group, or members of other groups**. We will ask you separately about what you believe the REALITY of these interactions are (how people actually behave), and what you believe the IDEAL state of these interactions should be (how people should behave).

We will present you with a number of statements. Please evaluate to what degree you agree with how REALISTIC each of these statements is, and then how IDEAL it is. Do this by clicking on the appropriate number which reflects your opinion most accurately.

NEXT

# Doctoral Dissertation: Minority versus Majority

Your personal code: 123456789012345678900008

Please take a moment to think about *all the different groups, classes and social categories you encounter in your everyday life* (for example, your workplace, your university, your political party, your community, your city of origin, your neighbourhood etc.). Try to recall specific interactions and situations in which your group membership was important. Think also about the way your groups support you, in terms of material resources, but also emotionally, politically, etc.

Keeping this in mind, please indicate to which degree you agree with the statements below. We ask you to indicate how **REALISTIC** each statement is, and then how **IDEAL** it is. Circle the number which reflects your opinion most accurately.

	REALITY			IDEAL						
	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5
1. People help members of their own group.	Disagree completely	Neither	Agree completely	Disagree completely	Neither	Agree completely				
2. People return favours to other members of their own group.	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5
3. People cooperate with members of their own group in group tasks.	Disagree completely	Neither	Agree completely	Disagree completely	Neither	Agree completely				
4. People care how other group members treat each other.	Disagree completely	Neither	Agree completely	Disagree completely	Neither	Agree completely				
5. People betray members of their own group.	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5
6. People punish those members of their own group who do not return favours.	Disagree completely	Neither	Agree completely	Disagree completely	Neither	Agree completely				
7. People will break contact with members of their own group who do not contribute to the group as a whole.	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5
8. People do favours for members of their own group.	Disagree completely	Neither	Agree completely	Disagree completely	Neither	Agree completely				
9. People will exclude members of their own group who do not share what they have with others in the group.	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5
10. People gladly contribute to their group as a whole.	Disagree completely	Neither	Agree completely	Disagree completely	Neither	Agree completely				
11. People isolate those group members who overuse common resources.	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5
12. People dislike it when members of their own group differentiate themselves.	Disagree completely	Neither	Agree completely	Disagree completely	Neither	Agree completely				
13. People can count on their group for help if something bad happens to them.	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5
14. People distrust those members of their own group who stand out.	Disagree completely	Neither	Agree completely	Disagree completely	Neither	Agree completely				
15. People will take action against group members who take advantage of common resources without contributing to them.	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5
16. People will exclude members of their own group who do not share what they have with others in the group.	Disagree completely	Neither	Agree completely	Disagree completely	Neither	Agree completely				

NEXT

# Doctoral Dissertation: Minority versus Majority

Your personal code: 123456789012345678900008

We are all members of different social groups or social categories. Some of such social groups or categories pertain to gender, religion, nationality, ethnicity and socioeconomic class. We would like you to consider your membership in those particular groups and your memberships in them. There are no right or wrong answers to any of these statements; we are interested in your honest reactions and opinions. Please read each statement carefully, and respond using the following scale.

1. I am a worthy member of the social groups I belong to.	<input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="radio"/> 5 <input type="radio"/> 6 <input type="radio"/> 7
	DISAGREE AGREE
2. I often regret that I belong to some of the social groups I do.	<input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="radio"/> 5 <input type="radio"/> 6 <input type="radio"/> 7
	DISAGREE AGREE
3. Overall, my group memberships have very little to do with how I feel about myself.	<input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="radio"/> 5 <input type="radio"/> 6 <input type="radio"/> 7
	DISAGREE AGREE
4. Most people consider my social groups, on the average, to be more ineffective than other social groups.	<input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="radio"/> 5 <input type="radio"/> 6 <input type="radio"/> 7
	DISAGREE AGREE
5. I feel I don't have much to offer to the social groups I belong to.	<input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="radio"/> 5 <input type="radio"/> 6 <input type="radio"/> 7
	DISAGREE AGREE
6. Overall, I often feel that the social groups of which I am a member are not worthwhile.	<input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="radio"/> 5 <input type="radio"/> 6 <input type="radio"/> 7
	DISAGREE AGREE
7. In general, belonging to social groups is an important part of my self-image.	<input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="radio"/> 5 <input type="radio"/> 6 <input type="radio"/> 7
	DISAGREE AGREE
8. Overall, my social groups are considered good by others.	<input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="radio"/> 5 <input type="radio"/> 6 <input type="radio"/> 7
	DISAGREE AGREE
9. I often feel I'm a useless member of my social groups.	<input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="radio"/> 5 <input type="radio"/> 6 <input type="radio"/> 7
	DISAGREE AGREE
10. In general, others think that the social groups I am a member of are unworthy.	<input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="radio"/> 5 <input type="radio"/> 6 <input type="radio"/> 7
	DISAGREE AGREE
11. The social groups I belong to are unimportant to my sense of what kind of a person I am.	<input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="radio"/> 5 <input type="radio"/> 6 <input type="radio"/> 7
	DISAGREE AGREE
12. In general, I am glad to be a member of the social groups I belong to.	<input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="radio"/> 5 <input type="radio"/> 6 <input type="radio"/> 7
	DISAGREE AGREE
13. I am a cooperative participant in the social groups I belong to.	<input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="radio"/> 5 <input type="radio"/> 6 <input type="radio"/> 7
	DISAGREE AGREE
14. In general, others respect the social groups I am a member of.	<input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="radio"/> 5 <input type="radio"/> 6 <input type="radio"/> 7
	DISAGREE AGREE
15. I feel good about the social groups I belong to.	<input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="radio"/> 5 <input type="radio"/> 6 <input type="radio"/> 7
	DISAGREE AGREE
16. The social groups I belong to are an important reflection of who I am.	<input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="radio"/> 5 <input type="radio"/> 6 <input type="radio"/> 7
	DISAGREE AGREE

NEXT

# Doctoral Dissertation: Minority versus Majority

Your personal code: 123456789012345678900008

Read the following statements and indicate to what degree do you agree or approve each of them by circling the appropriate number from 1 to 7. Please do not think too hard about the statements. Instead, give the first answer that pops into your head.

1. Having some groups on top really benefits everybody	<input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="radio"/> 5 <input type="radio"/> 6 <input type="radio"/> 7
	DISAGREE AGREE
2. No one group should dominate society.	<input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="radio"/> 5 <input type="radio"/> 6 <input type="radio"/> 7
	DISAGREE AGREE
3. We should not try to guarantee that every group has the same quality of life.	<input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="radio"/> 5 <input type="radio"/> 6 <input type="radio"/> 7
	DISAGREE AGREE
4. It is probably a good thing that certain groups are at the top and other groups are at the bottom.	<input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="radio"/> 5 <input type="radio"/> 6 <input type="radio"/> 7
	DISAGREE AGREE
5. We should work to give all groups an equal chance to succeed.	<input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="radio"/> 5 <input type="radio"/> 6 <input type="radio"/> 7
	DISAGREE AGREE
6. We should do what we can to equalize conditions for different groups.	<input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="radio"/> 5 <input type="radio"/> 6 <input type="radio"/> 7
	DISAGREE AGREE
7. Groups at the bottom should not have to stay in their place.	<input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="radio"/> 5 <input type="radio"/> 6 <input type="radio"/> 7
	DISAGREE AGREE
8. An ideal society requires some groups to be on top and others to be on the bottom.	<input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="radio"/> 5 <input type="radio"/> 6 <input type="radio"/> 7
	DISAGREE AGREE
9. It is unjust to try to make groups equal.	<input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="radio"/> 5 <input type="radio"/> 6 <input type="radio"/> 7
	DISAGREE AGREE
10. Group equality should be our ideal.	<input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="radio"/> 5 <input type="radio"/> 6 <input type="radio"/> 7
	DISAGREE AGREE
11. Some groups of people are simply inferior to other groups.	<input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="radio"/> 5 <input type="radio"/> 6 <input type="radio"/> 7
	DISAGREE AGREE
12. No matter how much effort it takes, we ought to strive to ensure that all groups have the same chance in life.	<input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="radio"/> 5 <input type="radio"/> 6 <input type="radio"/> 7
	DISAGREE AGREE
13. Group equality should not be our primary goal.	<input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="radio"/> 5 <input type="radio"/> 6 <input type="radio"/> 7
	DISAGREE AGREE
14. We should not push for group equality.	<input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="radio"/> 5 <input type="radio"/> 6 <input type="radio"/> 7
	DISAGREE AGREE
15. Groups at the bottom are just as deserving as groups at the top.	<input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="radio"/> 5 <input type="radio"/> 6 <input type="radio"/> 7
	DISAGREE AGREE
16. Groups dominance is a poor principle.	<input type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="radio"/> 5 <input type="radio"/> 6 <input type="radio"/> 7
	DISAGREE AGREE

NEXT

## Doctoral Dissertation: Minority versus Majority

Your personal code: 123456789012345678900008

We would like to ask you several questions about you personally. Please keep in mind that the information you give us will be anonymous, and used only for academic purposes. Please answer all the questions as precisely and as honestly as you can.

Sex:  M  F

Age:

Ethnicity:

Highest academic degree attained:

- 1. No schooling completed
- 2. Primary school
- 3. Secondary school
- 4. High school
- 5. Trade/technical/vocational training
- 6. Bachelor's degree
- 7. Master's degree
- 8. Professional degree
- 9. Doctoral degree

**Household composition**

What is your marital status?

- 1. Single, not in a committed relationship
- 2. Single, in a committed relationship
- 3. Married or in a domestic partnership
- 4. Widowed
- 5. Divorced
- 6. Separated

Do you have any children living with you?

- 1. Yes, one
- 2. Yes, more than one
- 3. Yes, but they do not live with me
- 4. No

Employment status:

- 1. Employed for wages
- 2. Self-employed
- 3. Out of work, looking for work
- 4. Out of work, not currently looking for work
- 5. A homemaker
- 6. A student
- 7. Military
- 8. Retired
- 9. Unable to work

Do you consider yourself religious?

- 1. Yes
- 2. Somewhat
- 3. No

How would you describe your political worldview?

1  2  3  4  5  6  7

Left                      Center                      Right

### **Economic Games: A Quick Guide**

What follows is a list of economic games mentioned or used in the thesis. Each game is described in short, simple terms, based on what actions cause which outcomes for the players in the game. This guide is meant for clarification of some of the claims made, or examples given in the thesis. Thus, it is geared towards readers interested in human behaviour and psychology. Descriptions of the games in terms of their game theoretical classifications (e.g. cooperativeness or symmetry, etc.), stable strategies or mathematical equilibria are almost entirely left out. Instead, more time is spent on discussing what sort of interactions the games model, which motivations for different behaviours they entail, and why they are interesting from a psychological perspective.

Nevertheless, some of the language used might be unfamiliar to scholars not involved with game theory. For the purpose, a small glossary is included below. This glossary is not a generally accepted one – for example, a debate could be had on the use of repeated versus iterated games. However, since the glossary was meant only for this text, those debates should be put aside. The below words and concepts are listed because of their proposed psychological significance on the players encountering the game.

One-shot	Each participant plays the game only once, with the same partner(s).
Repeated	Each participants plays the game several times, with different partners. Thus repeated games are a series of one-shot games.
Iterated	Each participant plays the game several times with the same partner(s).
Finite	Participants are aware how many rounds of the game they will be playing.
Infinite	Participants are unaware when the game will end.



Simultaneous	Participants make their choices at the same time.
Sequential	Participants make their choices one after another.
Discrete	Participants can only choose between absolute actions, like “cooperate” or “defect”.
Continuous	Participants can choose to what degree they wish to cooperate or defect within the games.
Dyadic	The game has only two players.
N-person	The game has more than two players.
Cooperative	A game in which the rational strategy is to cooperate, regardless of what the partner(s) does/do.
Non-cooperative	A game in which the rational strategy is to defect, regardless of what the partner(s) does/do.
Symmetrical	Both players in the game face the same outcomes for the same behaviour.
Asymmetrical	Players face different outcomes for the same behaviour.

### **Prisoner’s Dilemma Game (PDG)**

The Prisoner’s Dilemma game is a two-player economic game in which each participant has to decide whether to cooperate or defect in an exchange. As with most economic games, these choices are usually (but not always) done simultaneously, in a communication vacuum. While some PDGs are discrete, there is a trend towards making them continuous, thereby allowing for more variance in the data.

If both players cooperate, they achieve the most beneficial mutual outcome, sometimes referred to as Reward, or R. However, the player who defects while the other cooperates can receive an even higher prize, called Temptation (T). The player who had cooperated while the other defected end up with the worst possible outcome, called Sucker

(S). Finally, the Punishment, or P, outcome is one arising if both players choose to defect. In this case, both players receive a payoff smaller than R, but not as bad as S. This complex relationship between payoffs is the fundamental condition for the establishment of the PDG. We can express it as,

$$T > R > P > S$$

In other words, the reward for defection is the highest, while the punishment for being taken advantage of is the harshest. Thus, psychologically speaking, the PDG is a mixed-motive game. Participants can choose to defect out of greed (chasing after T), or out of fear (trying to avoid S). Unsurprisingly, therefore, the “best thing to do” in a one-shot PDG is to defect: this way, the player is sure to avoid the disastrous Sucker outcome, and stands the chance of getting the best one, Temptation.

However, if the PDG is iterated, the best strategy is to cooperate until the last round. This was most memorably shown during Robert Axelrod’s 1981 computer tournament. Enthusiasts (academics as well as non-academics) from around the world were invited to submit their strategy for solving the iterated PDG. The algorithms they wrote and submitted to Axelrod’s lab were faced off against each other in 200 rounds. Out of the numerous profit-maximizing or retaliatory strategies submitted, the unlikely “winner” was the Tit-for-Tat strategy, written by Dr. Anatol Rapoport. The Tit-for-Tat was one of the simplest strategies, perhaps surpassed in simplicity only by the three control algorithms implemented by Axelrod himself: All-C (always cooperate), All-D (always defect), and Random. In essence, Tit-for-Tat was a benevolent but reciprocating strategy. It cooperated on the first try. After the first round, Tit-for-Tat did what the partner did on the previous trial, and thus until the end. Notably, Tit-for-Tat never made a greater profit than its partner. Yet, while all the other, flashier strategies fluctuated in winnings depending on their partner, Tit-for-Tat was consistent. In fact, the only strategy to ever outperform Tit-for-Tat was Tit-for-Two-Tats, which reciprocated the partner’s behaviour only after two rounds. Axelrod’s findings and the story of lowly Tit-for-Tat revolutionized the way we thought about the evolution of cooperation, even if its implications never reached the ears of the majority of neoliberal economists.

While, arguably, the one-shot PDG is a rare occurrence, the iterated PDG resembles any long-term partnership between organisms which is based on exchange. The moment

one partner stands to gain by letting the other cooperate without cooperating themselves – they are facing a Prisoner’s Dilemma game. This very basic set-up puts the PDG at the core of all other social dilemma games, a lot of which have been designed with the PDG in mind.

### **Public Goods Game (PGG)**

The Public Goods game is an n-person social dilemma game in which each participant has to choose between behaving selfishly and contributing to a common pool. It can be described as an n-person Prisoner’s Dilemma game since the dilemma individuals face is the temptation of letting everybody else cooperate while failing to cooperate themselves. Again, it can be discrete or continuous, usually done anonymously, simultaneously, and in a communication vacuum. The PGG is played as either a one-shot or, more commonly, as a repeated game.

Each individual taking part in the game is given an initial endowment. They are free to either cooperate (contribute to the common pot), or defect (keep the endowment for themselves). The contributions of all participants are gathered into a common pot which is then multiplied by a factor  $r$ . This increase in the total amount contained in the common pot is meant to model the greater value of resources which are gathered in this way, and made more available to the entire community.

After the multiplication, the common pot is redistributed equally to all participants in the PGG, irrespective of how much any single participant contributed to the common pot. In this way, it makes sense for each participant to contribute nothing to the common pot, and take advantage of the fact others are contributing. However, such selfish thinking would lead to a collapse of the public good. In addition, the presence of defectors or freeriders (participants who fail to contribute, or contribute less than others) causes more and more defection in the subsequent rounds.

The repeated Public Goods game is characterized by mid-range initial cooperation levels which typically fall over the following rounds to very low levels of cooperation. There are at least three prominent methods for increasing cooperation levels in the PGG, and keeping it high: communication between participants, a system of reward, and a system of punishment.

### **Intergroup Prisoner’s Dilemma – Maximizing Difference Game (IPD-MD)**

The IPD-MD is a complex, n-person game in which each individual has to choose between pursuing a selfish goal, contributing to the ingroup common pot, or a between-group common pot. Importantly, it is played between two distinct groups of people. These groups can be real or minimal.

While the IPD-MD can be played as a one-shot game, it is more often a repeated, anonymous, and simultaneous game. Since the players' rewards are calculated by taking into consideration the choices of all the players in the game, the choices are usually discreet. This way the calculation is kept simple, making it more likely that the participants will understand it.

As in the PGG, the participants are given an initial endowment. They can they choose to either keep the endowment for themselves, contribute it to an ingroup common pot (as in the PGG), or to a between-group common pot (which behaves like the common pot for the PGG while at the same time decreasing outgroup rewards). The selfish choice means the participant will keep their initial endowment for themselves. The pro-social choice can be contributing either to the ingroup common pot, or the between-group common pot. The latter is also considered an act of outgroup derogation.

The purpose of the IPD-MD is to test whether people will, under different circumstances, choose to benefit their own group, or simultaneously benefit the ingroup while damaging the outgroup. Typically, people will prefer to leave outgroup outcomes alone, and contribute only to the ingroup common pot.

### **Allocation Game**

The Allocation game is a simple economic game in which a single participant allocates to one, two or more other participants. Thus, the allocation game can be an n-person game which is made up of repeated dyadic interaction between the allocator and his or her targets. It is asymmetrical, since the allocators' rewards are independent of their recipients' actions, while the recipients' rewards are (sometimes entirely) dependent on the allocator's choices. The choices are most commonly continuous. This makes the Allocation game similar to the Dictator game. However, the allocators (unlike the dictators) do not get to keep the money they do not allocate to the target(s).

The Allocation game can take two main forms which can change the game fundamentally – either the allocations are done independently for each target, or the allocation to one target depends on how much was previously given to another target. In the first case, the allocator receives a separate amount of money for each target. The allocator may choose to give the entirety of the money to a single target without impacting their ability to give to other targets. In the second case, however, the allocator receives a single endowment from the experimenter which they have to distribute between the targets. For example, it is common to present the allocator with two targets at the same time, and ask them to distribute the money between them. Thus, the amount of money that the allocators decides to give to one target impacts the amount of money they are able to give to the other target.

### **Gift-Giving Game**

The Gift-Giving game is an n-person, circular Dictator game. It can also be interpreted as a Public Goods game, however, there is no stable common pot available. Rather, the common good is the willingness of every individual participant to behave generously. The game is symmetrical, and the choices within it usually continuous. It is most often played between anonymous participants.

At the beginning of the game, all participants receive an initial endowment. They choose whether and how much to pass on to the next participant in the chain. This participant does the same for the next, and so on until the final person in the chain, who allocates money back to the first participant, closing the circle.

The money participants chose to give to the next participant in the chain is multiplied by a factor  $r$ . This represents the increase in value which stems from availability of the gift. Thus, it is in the interest of each player to contribute nothing to the next person in the chain, while receiving as much as possible from the previous player. However, if all participants behaved this way, there would be no increase in the value of their endowments through the act of giving.

The Gift-Giving game is appropriate to measure altruism, generosity, and general prosociality. The idea is that the more positive people feel about their circle of co-

dependents, the more likely to 1) forego immediate self-interest to allocate to another person, and 2) risk being cheated by the participant preceding them in the chain.

### **Dictator Game (DG)**

The Dictator game is a dyadic, asymmetrical game in which one person is assigned the role of dictator while the other is assigned the role of recipient. However, the dictator has all the power in this game while the recipient is passive. They are given an initial endowment by the experimenter and told to choose how much of it to give to the recipient, and how much to keep for themselves.

Obviously, the selfish, profit-maximizing choice in the DG is for the dictator to keep the entire endowment for themselves, and leave the recipient with nothing. For this reason, the DG is used to test generosity and other-regarding preferences. However, most people behave in a fair, or near-fair way, allocating between one third and one half of the initial endowment.

### **Trust Game (TG)**

The Trust game, as the name suggests, is an economic game meant to model trust. It is a dyadic, asymmetrical game in which one person is assigned the role of truster, while the other is assigned the role of trustee. These roles are often assigned randomly, or seemingly randomly. The truster always has the first move, making the TG a sequential game. Frequently, the trust game is played as a repeated game, so that all participants can experience both roles with different partners. Alternatively, data about the participants' behaviour as either the truster or the trustee can be gathered via the strategy method, i.e. by giving participants all the possible options and asking them to indicate their responses to each of the options.

From the truster's perspective, the TG looks as follows: the trusters are given an initial endowment by the experimenter. They are then given the choice to either donate the endowment to another person (the game is often discreet), or keep it for themselves. In other words, they can either trust / invest in another person, or refuse to enter into the exchange. If they refuse the exchange, they keep the initial endowment, and an equivalent amount of money is usually paid to the trustee (often without telling them they were not

chosen to be trusted). If they choose to donate the endowment to the trustee, this amount of money is multiplied by a factor  $r$ . This factor is usually 4, thus the money is quadrupled before it reaches the trustee.

By giving their endowment to the trustee, the truster effectively surrenders their power. From this point on, the trustee is solely responsible for both their, and the truster's outcomes. The trustee, having received the quadrupled amount of money, now behaves like a dictator in the Dictator game. In other words, they distribute the money between themselves and the truster.

Every decision in the TG can be made in a continuous way, but it is more often presented as a discreet choice. Thus the truster can either stop the game (take the initial endowment) or transfer it to the trustee, where it will be quadrupled. If the latter is the case, the trustee can either keep the entire amount for themselves, or distribute it equally.

The TG is considered a measure of trust. Indeed, people will show greater levels of trust for ingroups members rather than outgroup members, as well as for people with whom they have had previous contact, rather than strangers.

### **Ultimatum Game (UG)**

The Ultimatum game is a dyadic, asymmetrical economic game very similar to the DG. The main difference is that the recipient is not powerless. Rather, they are able to reject the offer made to them by the dictator. This rejection has dramatic consequences – a rejection in the UG means that neither the dictator nor the recipient get paid. Since these choices have to be made one after the other, the UG is necessarily a sequential game. As with the TG, however, the participants are sometimes repeatedly paired with different people to experience both roles. Alternatively, they answer a questionnaire in which their responses to different possible offers in the UG are recorded using a strategy method.

The first person to make a choice is the dictator who performs a distribution of an initial endowment. This distribution is, in effect, an offer that is communicated to the recipient. At this point, all the power is transferred to the recipient who can either accept or reject the offer. If the offer is accepted, both the dictator and the recipient are paid as the

dictator initially suggested. If the offer is rejected, neither the dictator nor the recipient is paid.

There are no real selfish options in the UG – the dictator cannot be sure that a selfish offer will be accepted, while the recipient cannot dictate the initial offer at all. For the recipient, the rational, profit-maximizing choice is to accept any offer because the alternative is to be paid nothing. However, participants often reject offers which dip below one third of the initial endowment. Rejection of unfair offers in the UG is considered a punishment. Rather than motivated by an abstract sense of justice, rejections are more closely related to retaliation. The psychology behind rejections in the UG has to do with an unwillingness to be taken advantage of in an interpersonal exchange.

### **Third Party Punishment Game (TPP)**

The Third Party Punishment game is a dyadic, asymmetrical game, but it is played in an n-person setting. A PGG, Gift-Giving game or the DG are usually the backdrop for the TPP. Participants who have not themselves taken part in these games (thus, they are third parties) are invited to evaluate and sanction other players, given information about their choices from the games. The participant – the punisher – has all the power in this interaction. The TPP can be played as a one-shot, or as a repeated game.

Punishers in the TPP are given a certain initial endowment by the experimenter. Thereafter they are introduced to the game (e.g. PGG or DG) whose players they would be evaluating and impacting by their decisions. Sometimes, the punishers had previously taken part in such games themselves. However, if this is the case, the punisher had not interacted with the people they are now judging.

Punishers may keep the entire endowment for themselves. Alternatively, they can expend a part of it to punish a participant, or a series of participants, of their choice. This amount is multiplied by a factor  $r$ , and the equivalent is reduced from the targeted player's rewards. In this way, the participant is investing in punishment of a target about whom they have limited information, usually information on previous behaviour and (sometimes) group membership.



The predecessor of the TPP is a Second Party Punishment game, in which the punisher is part of the group they are invited to sanction. This technique is used to introduce peer punishment in the PGG, where it has been shown to increase cooperation levels and keep them high. However, in the TPP, the punisher has no vested interest in donning out punishment, since they are not part of the original interaction. This makes the TPP a potential measure of abstract justice, as well as biases in the distribution of sanctioning systems between groups.

An alternative to punishment is reward, which likewise may be donned out by a third party at a cost to themselves. This game has no particular name, but it is equivalent to the TPP, except that the cost the participant chose to incur to provide the reward is multiplied and added to the target player's outcomes.

### **Preemptive Strike Game (PSG)**

The Preemptive Strike game (PSG) is a dyadic symmetrical game played in real time. This means that there is a time frame during which both participants have to make their choices. The choices given to either participant is either to push a red button, or to do nothing. However, the first participant to push the red button is the only one whose action will have meaning in the game. It is a one-shot game, offering two discrete choices.

Participants in the PSG are given an initial endowment. Both players stand to gain the highest possible payoff if they do nothing, meaning if nobody pushes the red button. Usually, they have no opportunity to communicate their intentions or coordinate their actions. They are given a set time frame within which they have to make up their minds. This time frame can (but does not have to be) communicated to the participants and made salient.

If one of the participants presses the red button, part of their reward is reduced by a  $x$ . At the same time, the other participant's reward is reduced by  $y > x$ . In addition, they lose the ability to lose the button effectively – meaning, they cannot retaliate. A pair of rational players should see that it is not in the interest of either player to push the red button. However, if one player believes their partner to be spiteful, fearful, confused, or for any other reason likely to push the red button, they are better off doing it first.

In this way, the PSG is meant to capture defensive aggression, i.e. the willingness of attack another party for the sole reason that they are able to attack you. The PSG's setup allows researchers to control the cost of pushing the button (attacking) and the cost of doing nothing while the partner pushes the button (being victimized), as well as other variables that may impact the willingness to strike pre-emptively, such as group membership, depletion of self-control, or trait psychopathy.

The PSG confounds two main motivations for attack: fear and spite. To discern one from the other, researchers sometimes add a scenario at the end of the PSG which faces participants with the same experimental set up, but with two buttons: a red and a blue one. While the red button performs the same function as it does in the original game, the blue button will defend the participant from attack at a cost to themselves, but at no cost to the other player. In other words, by pushing the blue button, participants can eliminate the other player's ability to attack them without damaging their outcomes. The choice of red button when the blue one is available is considered spiteful.

