

Moderators of Intergroup Discrimination in the Minimal Group Paradigm: A Meta-Analysis

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Abstract: The minimal group paradigm (MGP) has been used as a method to demonstrate intergroup discrimination between arbitrary groups for the past 45 years. Recently, researchers have expanded the scope of MGP experiments to test what additional factors increase, decrease or moderate intergroup discrimination. However, a broad analysis of these findings is missing from the literature. Through a systematic review of minimal group experiments since 1970, we provide a greater understanding of what factors increase levels of intergroup discrimination in minimal groups. We find the strongest evidence for the impact of priming norms and increasing identity salience on intergroup discrimination. We also identify limitations of the current minimal group literature, including an overrepresentation of findings from white, middle-class, western samples and from experiments with student subjects. Building off of these findings, we offer recommendations on what future research on the minimal group paradigm should consider.

Keywords: minimal group, identity, intergroup discrimination

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Introduction

One of the main tenets of social identity theory (Tajfel & Turner, 1979) is that maximizing the difference between one's own group (ingroup) and another group (outgroup) increases positive social identity and self-esteem (Brewer, 1979; Oakes & Turner, 1980; Tajfel, Billig, Bundy, & Flament, 1971). Individuals tend to exhibit a disproportionate affinity towards members of their own group, and discriminate against members of other groups (known as intergroup discrimination). While such phenomena of prejudice and discrimination are evident in intergroup conflicts deep into history, it was only in the second half of the twentieth century that researchers began to experimentally test how social categorization *per se* can lead to intergroup discrimination.

Early research on the drivers of intergroup discrimination had focused on the importance of social context and intergroup experiences. As one explanation of intergroup conflict, belief congruence theory emphasizes assumed differences in attitudes and beliefs between groups as the cause of prejudice and intergroup discrimination (Rokeach, 1960). Linville (1982) also draws on this theory, attributing intergroup discrimination to stereotypes attributed to the ingroup and outgroup as a result of greater familiarity with ingroup members. Drawing upon concrete differences between and conflict among groups, realistic group conflict theory (Campbell, 1965) points to a conflict in group goals or resources as a driver of intergroup discrimination.

These perspectives all assume that intergroup discrimination is a symptom of intergroup relationships, resource conflicts, or stereotypes about the other group. However, beginning in the mid-twentieth century, researchers began to question whether these intergroup contextual factors were necessary to generate intergroup discrimination. Researchers began to ask: to what extent

does intergroup discrimination emerge when individuals are grouped in arbitrary ways (into minimal groups), without allowing for the establishment of elements normally associated with group identities such as shared interests, viewpoints, experiences, traits or familial ties?

Among the first studies to test this were the Robber's Cave experiments in the 1950s. In these experiments, researchers took a group of culturally homogenous (from similar socio-economic, racial, and family backgrounds) young boys to a summer camp and divided them into two teams, separating individuals that had previously established ties to each other. Grouped along arbitrary lines, the researchers found that after participating in several days of activities designed to emphasize team building and intergroup conflict, both groups of boys showed significant prejudice against the other group and favoritism towards their own group (Sherif, Harvey, White, Hood, & Sherif, 1961).

Following the Robbers Cave study, scholars began to explore what the minimum levels of group identification were that could elicit intergroup bias. In 1970, Henri Tajfel tested the importance of group significance to intergroup discrimination in a laboratory setting by measuring how people allocated money differently between an ingroup member and an outgroup member when the groups were randomly assigned (Tajfel, 1970). This study demonstrated that simply categorizing individuals into two arbitrary groups is adequate to generate favoritism towards the ingroup, and discrimination against the outgroup. This experimental technique to measure levels of intergroup discrimination in minimal group settings became known as the minimal group paradigm (MGP).

The MGP is argued to be an effective tool to uncover latent tendencies towards intergroup discrimination. By suppressing other factors that could elicit a social response such as inter- or intra-group interactions, judgments, or expectations of personal benefit or reciprocity,

MGP experiments show how intergroup discrimination is a tendency of human nature, even when the groups have no social meaning. Diehl (1990) identifies a number of key aspects of minimal group paradigm experiments that allow for this distinction between social and psychological drivers. First, the only difference between the two groups should be their membership in categories of a trivial nature. There should be no face-to-face interaction, and group membership of the other subjects should remain anonymous. Responses should be of no utilitarian value to the subjects themselves outside of the experiment or laboratory, yet they should be concrete rewards or punishments, not a qualitative evaluation of the individuals. Finally, the strategy of intergroup discrimination should be in competition with more rational or utilitarian approaches, and there should be no expectation of reciprocity or future interaction between the groups. By controlling for the social norms of preexisting attitudes, reciprocity and self-interest, MGP experiments demonstrate that humans have a tendency to discriminate against the outgroup and favor the ingroup in any situation.

Tajfel's 1970 experiment was designed to study the minimum necessary and sufficient conditions for intergroup discrimination. Since then, researchers have sought to expand on Tajfel's findings by testing what factors and situational contexts contribute to or increase intergroup discrimination between minimal groups. Numerous studies have added in "enhancements" to the initial MGP design to determine how they contribute to or moderate intergroup discrimination. These enhancements have been diverse, from analyses looking at how different types of group categorizations can increase the threat to self-esteem and increase intergroup discrimination (Abrams & Hogg, 1988; Diehl, 1990), to testing the role of self-esteem (Lemyre & Smith, 1985) and attitude congruence (Allen & Wilder, 1979), among others. While the literature on MGP enhancements has grown, it is difficult to broadly understand what we

know about the moderators of intergroup discrimination between minimal groups. Additionally, some recent work has called into question the universality of intergroup discrimination in minimal groups, finding evidence that MGP studies do not consistently result in discrimination among all individuals (Kranton, Pease, Sanders, & Huettel, 2016). These findings call for a broad review of studies to better understand the contexts in which intergroup discrimination is most likely to arise.

To clarify the state of the MGP literature, this study identifies and analyzes the level of consensus on what factors increase intergroup discrimination. Through a systematic review of minimal group studies from the past 45 years, we identify the contexts, traits and enhancements that lead to increased intergroup discrimination in minimal group situations. Following the guidance on MGP studies laid out by Diehl (1990), we identify 84 minimal group studies in the social science literature. We then categorize them to draw conclusions about what enhancements increase levels of intergroup discrimination, provide descriptive information about the temporal and geographic trends in the literature, and offer an analysis of gaps that should be addressed in future MGP studies.

Methods

While hundreds of studies have expanded on Tajfel's original MGP experiments, a clear understanding of the factors that exacerbate or diminish intergroup discrimination does not yet exist. This meta-analysis systematically evaluates minimal group paradigm studies from 1970-2015 to identify trends in findings (which experimental enhancements and subject traits increase intergroup discrimination) as well as publication characteristics to provide a broad state of the

field of minimal group studies. We apply the features highlighted by Diehl (1990) to isolate only pure MGP studies; while Tajfel's original methodology has been expanded to test the existence of the MGP on non-allocation dependent variables (such as emotional sentiments towards the other group) and under conditions of reciprocity, we focused on pure allocation experiments and games that only took place in a single instance.

Sample Selection

To identify the sample of studies, we searched Web of Science for all articles that included the terms “minimal group” “minimal groups” “minimal intergroup”, or either “ingroup” or “outgroup” AND “reward” or “allocation” in the abstract or title. This produced 517 articles, but a subject-area restriction to only the social sciences decreased the final sample to 358 articles. To further refine the dataset to include only “pure” minimal group experiments, we implemented a series of additional restrictions. To be included in the final dataset, the studies needed to meet the following requirements, resulting in a final dataset of 84 studies (from 64 separate articles):

- Be published in a journal article form
- Report on unique data or experiments (no summaries of experiments run by others)
- Have a resource allocation as a dependent variable (money, points, or material rewards)
- Not include any form of strategic game (such as a Prisoner's Dilemma) that leads the subjects to make allocation decisions based on other's expected actions

Additionally, if a single article reported on multiple experiments that met the criteria for inclusion, we included each experiment as a separate entry. Once we finalized the dataset, we mined key information from each study to answer our main research questions. The data captured from each study included:

- Authors

- Geographic location of lead author
- Year
- Title
- Journal title
- Journal impact factor (as of 2016)³
- Sample size
- Sample type (children, students, or adults, and any further details about the sample that were provided)
- Whether the study tested an experimental enhancement or a personal trait
- What that enhancement or trait was
- An abstract-level summary

Analytical Strategy

The meta-analysis involved both qualitative and quantitative analyses. The first analysis involved qualitative categorizations of the enhancements and traits that each study tested as moderators of intergroup discrimination. The intention of this analysis was to gain a more concise understanding of what features researchers have evaluated as moderators of discrimination between minimal groups before performing a quantitative analysis of the effectiveness of each type of enhancement in increasing intergroup discrimination. After reviewing each article, we grouped studies into ten groups based on similarities in the enhancements used in each.⁴ The categories included:

1. *Norms* (priming social norms such as loyalty or competitiveness)
2. *Group Status* (high or low status of outgroup compared to the ingroup)
3. *Identity Salience* (how strongly subjects identify with their group)
4. *Outcome Type* (positive or negative valence of the outcomes being allocated)

³ Thompson Reuters 2015 Journal Citation Reports Impact Factors

⁴ Studies were categorized under multiple groups if they tested several types of enhancements.

5. *Personality* (traits of the subjects' personality)
6. *Group Size* (whether the outgroup is smaller or larger)
7. *Gender & Age* (of the subjects)
8. *Mood* (emotional state of mind)
9. *Group Categorization* (number of groups, their interdependence, and manner of categorization)
10. *Miscellaneous* (including physiological traits, culture, and knowledge).

The qualitative review involved a close reading of the studies in each category and the summarization of their findings in narrative form. From this we draw category-level conclusions about the moderating impact that each enhancement has on levels of intergroup discrimination

After compiling and summarizing conclusions for the categories, we performed a quantitative analysis to measure the level of consensus among studies about whether the enhancements summarized in each category actually increased intergroup discrimination. We coded each study within a category to capture whether that enhancement or trait increased discrimination at a statistically significant level using a “0-.5-1” coding system. In this system, a study was assigned a “0” if the enhancement/trait was not found to increase discrimination between minimal groups, a “.5” if the evidence was mixed, and a “1” if it was definitively found to increase discrimination. After coding the studies, we calculated an average of all the individual study codes in each category to represent the level of consensus in the literature about the impact of each enhancement on intergroup discrimination (the category consensus score). We also reported the enhancement that the studies measured as a moderator of intergroup discrimination, the average impact factor of the studies in the category (to indicate prominence of the studies in the literature), and the median publication year (with minimum and maximum date ranges).

Results

We begin by qualitatively reviewing the studies included in each category to provide a deeper picture of the conclusions that we can draw about each enhancement. While the experimental designs differed for each study, examples of techniques used to create the enhanced situation are also discussed for each category.

Qualitative Category Summaries

1. Norms

Priming of norms and values has been shown to be a powerful driver of attitudes and behavior in psychological research, and that finding is replicated in several of these studies. Norm priming in these cases typically involved explicitly or implicitly leading the subject to consider a particular social norm to see if subsequent behavior is more or less in line with the social norm itself (for example, making subjects think about loyalty may lead to more favorable in-group distributions). In the context of the MGP, social norms that emphasize group adherence and intergroup competition have been shown to increase intergroup discrimination among participants. Priming subjects to consider loyalty to their groups has consistently been found to increase discrimination (Abrams, Rutland, Ferrell, & Pelletier, 2008; Hertel & Kerr, 2001; Montoya & Pittinsky, 2013), as has priming competitiveness between groups (Lee, Adair, Mannix, & Kim, 2012; Spielman, 2000). From a complementary perspective, priming subject with the opposite norm (that of equality) has been shown to lead to a decrease in intergroup discrimination (Maio, Hahn, Frost, & Cheung, 2009).

Other studies focused on the effect of priming the subject to feel that the outgroup is immoral (Abrams et al., 2008; Chen & Li, 2009; Hetherington, Hendrickson, & Koenig, 2014) or unfair (Diehl, 1990; Jetten, Spears, & R, 1996). Establishing the outgroup as immoral increases the psychological distance between how the subject perceives him or herself and the outgroup, and may also elicit a desire to “punish” immoral outgroup members.

Finally, several studies looked not at priming a particular norm, but allowing groups to coalesce around some ingroup norm of behavior. This generally occurs when the experiment allows for communication between ingroup members before making allocation decisions. The expectation of most of these studies is that establishing a group norm will result in increased discrimination. However, none of the studies evaluating this norm found evidence of increased intergroup discrimination (Amiot & Bourhis, 2005; Billig, 1973; Smith & Postmes, 2009).

2. *Group Status*

Expanding on the original MGP studies where groups were perceptually equal, many studies have looked at how intergroup discrimination changes when the groups are of different statuses. These studies define status in a number of ways, encompassing wealth, size, gratification/deprivation, and merit, but in each the group status is experimentally induced. Subjects are told that the groups are of unequal status, and that they are in either a high, low, or moderate status group. Many of the studies found that subjects in low status groups show more intergroup discrimination than high status groups, which aligns with expectations from social identity theory (SIT). According to SIT, humans exhibit

intergroup discrimination to increase self-esteem, which would be an expected objective of lower status groups.

However, findings of the studies in this category were inconsistent. While several studies found that low status groups discriminated more than high status groups (Caricati & Monacelli, 2010; Harvey & Bourhis, 2012; Moscatelli, Albarello, Prati, & Rubini, 2014; Otten, Mummendey, & Blanz, 1996; Platow et al., 1997), others found mixed results (Amiot & Bourhis, 2005; Dobbs & Crano, 2001; Harvey & Bourhis, 2013; Reichl, 1997; Rubin, Badea, & Jetten, 2014; Rubini, Moscatelli, Albarello, & Palmonari, 2007). Some also found no evidence of increased discrimination among low status groups (Rothgerber & Worchel, 1997), or that low status groups discriminate less (Moscatelli et al., 2014; Sachdev & Bourhis, 1991).

A few additional moderators identified in these studies may offer keys to understanding when status matters, and when it does not. Caricati (2010) found that when resources being allocated are perceived as unlimited, this reduces bias in low status groups. Amiot & Bourhis (2005) found that low-status groups are more discriminatory until the group members are allowed to communicate and establish ingroup norms, after which the high and low status groups discriminate equally. Dobbs & Crano (2001) provided evidence that the salience of intergroup differences may matter: when subjects were required to provide a justification for their allocations, discrimination decreased in high status groups, but increased in low status groups. Harvey & Bourhis (2013) built on the norms of fairness by demonstrating that the merit of group status matters. If group status is obviously random or undeserving, there is less discrimination (particularly among the high status groups). Similarly, Reichl (1997) showed increased levels of discrimination between high and low

status groups when the allocations are related to status, as opposed to status-unrelated measures, and Rubini et al (2007) showed that discrimination increases as status legitimacy increases.

3. Group Identity Salience

One of the most consistent findings across studies is that increasing the salience of a subject's group identity (how strongly they identify with their ingroup) increases the likelihood and extent of intergroup discrimination. These studies employ a number of different techniques to emphasize the connectivity that members feel to their group, and how available their group membership is in their minds. Herringer & Garza (1987) and Perreault & Bourhis (1999) both found that when the method of group categorization is more meaningful to or chosen by the subject (as opposed to ostensibly random assignment) and therefore creates stronger levels of identification with the ingroup, subjects' levels of intergroup discrimination increase. The level of connection that the subject feels to their group also matters. Moscatelli & Rubini (2013) found that increasing a sense of common fate within a group by linking ingroup outcomes increases outgroup discrimination, while Stroebe et al (2005) mimicked this with their observation that intergroup discrimination may be a consequence of expectations of ingroup reciprocity (although this assertion is countered by the findings of Gagnon & Bourhis (1996)). Taking a different approach, Diehl (1988) demonstrated that increasing outgroup similarity (and therefore perhaps decreasing ingroup identity salience) significantly decreases levels of intergroup discrimination.

While ingroup identification generally increases intergroup discrimination, some authors also found that this trend is amplified when combined with other group features. For example, Forgas & Fiedler (1996) found that while on its own group relevance does

not affect level of intergroup discrimination, when combined with a mood manipulation, those in a sad mood increased discrimination when group identity is salient. Linking to the group status literature, Leonardelli & Brewer (2001) found that majority group members only discriminate against an outgroup when their group identity is made more salient.

4. Outcome Type

Building off the Positive-Negative Asymmetry Effect (PNAE) previously established in social discrimination research (see Buhl (1999)), several studies tested how the valence and type of outcomes allocated increases or decreases levels of intergroup discrimination. The PNAE states that individuals discriminate more when allocating positive outcomes than negative ones. This finding was supported by three studies in this sample (Gardham & Brown, 2001; Hodson, Dovidio, & Esses, 2003; Jost & Azzi, 1996), although some found no evidence that outcome valence increases intergroup discrimination, or that it does so only under certain contexts (Amiot & Bourhis, 2003, 2005). Specifically, Amiot & Bourhis (2005) found that the PNAE only emerges after groups meet to form a group behavior norm. However, Smith & Postmes (2009) found the opposite – that the PNAE exists *until* group communication occurs. Otten et al (1996) found support for the PNAE unless the individual is a member of a minority or inferior group, in which case discrimination occurs equally for both types of outcomes.

Researchers have also evaluated how outcome type and relevance increases discrimination. Gaertner & Insko (2000) found that intergroup discrimination is particularly heightened when allocating bonus payments as opposed to monetary wage payments, providing support for the idea that subjects are more likely to discriminate on unexpected or “additional” payments. Similarly, Jost & Azzi (1996) found that subjects are less

discriminatory with monetary payments than with less tangible resources, such as calculator time to help solve math problems. Finally, as discussed briefly above, some subjects show a tendency to discriminate more on outcomes that are highly relevant to either the group status or the activity involved (Forgas & Fiedler, 1996; Hartstone & Augoustinos, 1995; Reichl, 1997).

5. *Personality*

Beyond context-specific enhancements, researchers have also sought to determine if there are aspects of an individual's personality that make them more or less likely to show intergroup discrimination in the MGP. While the results of these studies are mixed, there is evidence from between-subject experiments that a few personality traits consistently seem to increase discrimination in the MGP. Most prominent is low self-esteem, which has been shown in a number of studies to increase intergroup discrimination (Falk, Heine, & Takemura, 2014; Hogg & Sunderland, 1991; Hunter et al., 2005; Petersen & Blank, 2003). In these studies, self-esteem is measured prior to the MGP procedure, and then discrimination levels are compared between subjects with different pre-experimental self-esteem levels. This is again supported by one of the main tenets of social identity theory, which asserts that intergroup discrimination is done to increase self-esteem. Other studies have shown that subjects with an independent self-construal (thinking of oneself first as an individual) show discrimination primarily when self-esteem is threatened, while interdependent self-construal subjects (those that think of themselves first as members of society) show more discrimination during instances of low threat to self-esteem (Nakashima, Isobe, & Ura, 2008). Prosocial and antisocial tendencies also contribute to discrimination, with prosocial (less competitive) subjects showing less discrimination than

antisocial subjects (Platow, McClintock, & Liebrand, 1990). Meanwhile, Reynolds et al (2007) and Amiot & Bourhis (2005) both found little evidence that most of the traditional personality variables increase discrimination at all. The exception from Amiot & Bourhis (2005) is social dominance orientation (SDO), which was shown to increase levels of discrimination.

6. *Group Size*

Findings about the importance of group size – specifically the difference in size between the ingroup and the outgroup – on levels of discrimination are mixed. Certain studies find that heterogeneously sized groups somewhat counteracts the intergroup discrimination expected under the MGP. Jost & Azzi (1996), for example, found that more resources are allocated to larger groups, and in general there is no difference in level of discrimination between majority and minority groups. Leonardelli & Brewer (2001) found that minority groups are more likely to discriminate than majority groups, but only in certain situations. Without an enhancement increasing group salience, only minority groups showed discrimination. However, after group salience was primed, both minority and majority groups showed the same level of discrimination. Interestingly, they also observed that minority groups are more likely to discriminate as group satisfaction grows, while majority groups are more likely to discriminate as group satisfaction declines.

Two studies also show evidence of group size interacting with other enhancements. Otten et al (1996) found evidence of the PNAE, but only among members of a majority group. Minority group members discriminated equally when allocating punishments and rewards. Sachdev & Bourhis (1991) found that being a minority sized group increases the tendency for high-status groups to be more discriminatory.

7. Gender & Age

The studies in this category are unique. While most MGP studies find no difference in responses between males and females and therefore do not include them further in their analysis or report discrimination levels by subgroup, several studies did find significantly different levels of discrimination between males and females. For the most part, these studies found that males discriminated more than females. This trend seems to be strongest among younger children (Benozio & Diesendruck, 2015; Hartstone & Augoustinos, 1995). Specifically, Benozio & Diesendruck (2015) found that the increased discrimination among boys (compared to girls) disappeared in samples with older boys and girls. Yuki & Yokota (2009) found some evidence of increased discrimination among adult men, but Gaertner & Insko (2000) showed the opposite – that women discriminate more than men. Because the evidence is mixed and most other studies find no differences in discrimination levels between men and women, we cannot confidently find any consistent trends of how gender may increase discrimination.

Similarly, most MGP studies are done with a homogenous sample (overwhelmingly with university students). Of the few that do test different age groups, most find that younger children show more intergroup discrimination, offering some insight that perhaps the reduction in intergroup discrimination is learned. Benozio & Diesendruck (2015) performed their experiments on 3 and 6 year olds, and find that discrimination increases among the 3 year olds. While Plotner et al (2015) did not find a statistically significant outgroup bias in resource allocation, they did find that evidence that prosocial behavior towards the ingroup increases among 5 year olds but not 3 year olds.

8. Mood

Researchers have also investigated the relationship between emotions, or mood, and intergroup discrimination. In three different experiments, Forgas & Fielder (1996) tested how priming a positive or negative mood increases discrimination. While they initially found that subjects were more discriminatory when in a positive mood, they also reported that this effect is qualified based on personal relevance of the group. When personal relevance is low, a positive mood resulted in more discrimination. When personal relevance is high, a negative mood resulted in more discrimination.

Others have looked at how an uncertain mood can impact discrimination. Intergroup discrimination can increase self-esteem, but emphasizing a group identity can also help to reduce feelings of uncertainty (Hogg, 2000). Based off of this finding, several studies have looked more closely at the role that confusion or an uncertain state of mind plays in intergroup discrimination. Grieve & Hogg (1999) and Mullin & Hogg (1998) demonstrated that when subjects are placed into contexts designed to increase feelings of uncertainty (such as watching a confusing short film or not being able to solve an ambiguous puzzle), their resulting levels of intergroup discrimination are significantly higher than those in control groups. However, Hodson & Sorrentino (2001) showed that this effect is mediated by personality. In their study, they found no difference in discrimination between subjects in high uncertainty and low uncertainty contexts in general with the sample as a whole, but did find evidence that high uncertainty increases discrimination among certainty-oriented people.

9. *Group Categorization*

Three elements of group categorization were tested in the studies reviewed to determine how features of the MGP methodology might increase or decrease

discrimination. First, two studies investigated whether MGP-induced intergroup discrimination could occur when more than just two groups are formed. Both Hartstone & Augoustinos (1995) and Spielman (2000) found no significant ingroup bias in three-group (as opposed to two-group) contexts. Three studies also investigated the role of interdependence on the ingroup, testing whether dependence on other members of the ingroup (as opposed to autonomy) may increase discrimination. Gaertner & Insko (2000) found evidence in support of this, but only among men. Gagnon & Bourhis (1996) found that autonomous individuals discriminate as much as interdependent individuals.

Additionally, researchers have tested whether the manner of group differentiation moderates intergroup discrimination. Some evidence finds that while the groupings can be minimal in the sense that they can be created in the laboratory, groups that are ostensibly based on some sort of preference or trait (i.e. painting preference) are more likely to lead to intergroup discrimination than random, meaningless group assignments (Herringer & Garza, 1987). Additionally, if individuals are allowed to choose their group, they show more discrimination than when they are assigned (Perreault & Bourhis, 1999).

Additionally, Pinter & Greenwald (2011) tested the effectiveness of several different methods of forming minimal groups, including asking subjects to memorize the names of group members, asking them to imagine being a member of a particular group, random assignment, or preferences for paintings. While they found that the first is more effective at generating intergroup bias across a variety of outcomes, when considering only resource allocation, all forms of grouping are equally effective.

10. Miscellaneous

Finally, there were several studies in the sample that tested enhancements or traits that were unique to any other studies. Some research has been done on how physiological traits inform levels of intergroup discrimination. Sahdra et al (2015) found that individuals with more heart-rate variability show greater levels of discrimination. Volz et al (2009) found that social and personal identity processes draw on the same cerebral correlates using an fMRI during a MGP experiment. Falk et al (2014) focused not on physiological but on cultural traits to explain differences in discrimination. They found that Americans show higher levels of discrimination in MGP experiments than do Japanese subjects, partially mediated by self-esteem. Lastly, Yamagishi & Mifune (2008) tested how knowledge of the identities of each group moderates discrimination. They found that ingroup bias is more commonly found when both the allocator and the recipient know each other's group identities, but disappears when the allocator knows the identities but the subject does not.

Quantitative Category Consensus

In addition to the qualitative summaries of each enhancement category, we also performed a quantitative analysis of the level of consensus among the studies on the moderating role of each enhancement on intergroup discrimination. Table 1 presents the results of this analysis. The table includes the number of studies and level of consensus for each category, as well as descriptive features of the studies in each category, including the average journal impact score and range and median publication dates. The categories are listed in each row by number of studies in the category, followed by an indicator symbol that reflects the category's

prominence and consensus level in the literature.⁵ The indicator circle reflects both the number of studies in the category, and the consensus between the studies about whether the enhancement increases discrimination. The size of the circle reflects the number of studies in each category⁶ (the larger the circle, the more studies in the category), and the darkness gradient reflects the level of consensus among the studies about whether that enhancement increases discrimination (the darker the gradient, the higher the consensus score for that category).

[Table 1 about here]

The most frequent enhancement in the study sample norms priming, comprising studies that primed norms such as loyalty, equality or competitiveness among subjects prior to performing the minimal group experiment. Consensus about the effectiveness of norm priming in increasing intergroup discrimination was moderate (0.63 out of 1.0), signifying that about two thirds of the studies that tested this enhancement found that this tactic increased intergroup discrimination. This category of enhancements is also among the most recent MGP studies, with a median publication year of 2008 (although also the widest range, with the first norms study published in 1973).

Group status also included a fairly high number of studies (17), however the consensus score was less than 50% (0.47), indicating a great deal of disagreement among studies about whether differences in the status of groups can increase intergroup discrimination. Specifically, the findings of studies about how high- and low-status groups discriminate differently often conflicted with each other.

⁵ Miscellaneous category not included in quantitative analysis or Table 1

⁶ Studies were only included in the quantitative analysis if there was an enhancement being tested. Basic replications of the MGP were not categorized.

While there were fewer studies on this category (15), identity salience had the highest consensus score of all the enhancement categories (0.80 out of 1.0). These studies evaluated the importance of identity salience – or how relevant and top of mind group membership is – in intergroup discrimination, finding that increasing identity salience (even of arbitrary groups) increases intergroup discrimination quite consistently. There was a wide range of publication dates for studies in this category as well, ranging from 1985-2013, although the median publication date was 1999.

The category focusing on outcome type included 13 studies, but had the lowest consensus score of all the categories (0.42 out of 1.0). The conclusion of these studies on whether the valence of the rewards distributed between groups leads to increased or decreased levels of intergroup discrimination varied significantly, with several of the studies finding that valence matters (that distributing rewards leads to more discrimination than the distribution of punishments), and others finding that it makes no difference.

Finally, the smaller categories (personality, gender/age, group size, mood, and categorization) tended to have higher levels of consensus among the studies, but these consensus scores must be evaluated considering the smaller number of studies included in the category (it is easier to gain consensus among fewer studies). However, there does seem to be consistent evidence that factors such as gender (male) and age (younger), along with the subject's mood (both positive moods and increased uncertainty) and number of groups (two versus more than two) all increase intergroup discrimination. Apart from gender and age, these studies tend to be more dated, however, and the limited number of studies in these categories limits the generalizations we are able to draw. The specific findings of these categories are discussed further in the next section.

Publication Features

In addition to categorizing the studies, we also analyzed the temporal and geographic nature of MGP studies to determine trends in the study of MGP enhancements over time. Since the first MGP study in 1970, the use of this method to test intergroup discrimination has gradually increased. Studies in our dataset range from 1973-2015, with an average publication date of 2002 and a median date of 2007. Chart 1 shows the temporal trends of MGP studies included in this dataset, demonstrating a moderate upwards trend from 1970-2015 (of approximately 7% growth between the first study in 1973 and the final year of studies in the sample in 2015). It should be noted that the social science literature in general was also growing at a rate of about 2% per year during this time period (from 1987-2006) (Larsen & von Ins, 2010). There have also been several years with notably higher levels of publication of MGP studies, including in the mid-1990s, the early and late 2000s, and an increasing trend in recent years. Certain categories have also received more or less attention over time, as noted in Table 1. Studies evaluating the effects of group size, mood and identity salience were among the earlier studies, with many of the studies taking place in the 1990s. More recently, studies have focused on testing the effects of group status, norms, and demographics.

[Figure 1 about here]

Beyond a temporal account of MGP trends, this dataset can also shed light on where and how MGP studies are being done, and any associated limitations. An analysis of the location of the lead author of each study shows that most of the studies in our dataset come from Europe, North America and Oceania (Australia & New Zealand). Of the 64 distinct articles, 38% (24) were from North America (the United States and Canada), 36% (23) were from Europe (including the United Kingdom), and 19% (12) were from Oceania. The remaining studies were

from Asia (4) and Israel (1). Additionally, pertaining to the study samples themselves, the vast majority use high school or university students as their subjects. When the studies give additional information about the sample subjects, they tend to be classified as middle class and, if specified, predominantly white.

Discussion & Conclusion

This meta-analysis of MGP studies from 1970-2015 offers insight into the trends in the literature and a greater understanding of the factors that increase intergroup discrimination in a minimal group context. Through quantitative and qualitative analyses, we identify ten categories of MGP enhancements that have been found to have varying levels of impact on intergroup discrimination. Most prominently, we have found a strong consensus among many studies in the literature that norm priming and group identity salience are important drivers of intergroup discrimination. Consensus is also strong (although the number of studies limited) on the impact of certain demographics such as gender and age, mood, and group categorization design on increasing intergroup discrimination.

Our analysis of these studies has also led to several conclusions about the limitations of the MGP literature. The concentration of these studies from Western cultures highlights a main critique of this literature. By testing the paradigm and related enhancements primarily among Western university students, these studies fall victim to WEIRD (western, educated, industrialized, rich and democratic) samples, and the limitations of generalizability that follow (see Henrich, Heine, & Norenzayan, 2010). This trend is concerning, since levels of intergroup discrimination may be highly socially constructed, despite efforts of the MGP experiment design

to control for such differences. For example, some studies have already found cultural differences in minimal-group responses and intergroup bias between Americans and Japanese, potentially fueled by different norms of equality, interdependence, and self-esteem (Falk, Heine, & Takemura, 2014). Similarly, the vast majority of MGP research has been done by researchers in Western universities (Europe, North America and Oceania). Increasing the cultural and geographic diversity of these studies will contribute to a more whole understanding of the extent to which intergroup discrimination is an aspect of human nature, versus culturally-learned (Otten, 2016).

As for the enhancements of intergroup discrimination, the lack of strong consensus about the impact of several of the enhancement categories is fairly concerning. The categories with low consensus scores, including group status, outcome type, personality and group size, contain a number of studies that contradict each other's findings about the role that these factors play in increasing discrimination. More research is needed to better understand how and under what contexts each of these enhancements may indeed increase intergroup discrimination. Most interestingly, certain factors that we know contribute to different psychological judgments in other contexts, such as status and outcome types, show inconsistent findings in minimal group settings. Further research into these areas could shed more light into how they are applied in other psychological contexts.

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Tables & Figures

Table 1: Enhancement Categories and Level of Consensus on Increasing Intergroup Discrimination

Enhancement Category	Factors Increasing Discrimination	Number of Studies	Average Consensus Score	Average Impact Factor (sd)	Median Publication Date (Minimum-Maximum)
Norms	 Loyalty; Competitiveness	19	.63	3.08 (1.15)	2008 (1973-2014)
Group Status	 Low Status	17	.47	2.48 (1.35)	2007 (1991-2014)
Identity Salience	 Strong Identification	15	.80	2.50 (1.13)	1999 (1985-2013)
Outcome Type	 Positive Outcome	13	.42	2.12 (0.89)	2001 (1995-2010)
Personality	 (varied)	11	.59	1.71 (0.29)	2005 (1990-2014)
Gender/Age	 Younger Male	8	.75	3.23 (0.83)	2013 (2000-2015)
Group Size	 Minority/Small Group	7	.57	2.08 (0.66)	1996 (1991-2001)
Mood	 Positive Mood; Uncertainty	7	.79	3.17 (1.55)	1998 (1996-2001)
Categorization	 Num. of Groups; Interdependence	6	.75	2.13 (1.09)	2000 (1987-2013)

Figure 1: Temporal trends of MGP studies

