FORMAL EDUCATION AND INTERGROUP BEHAVIOR

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BY

[Signature]
Gregory V. Chauvin

APPROVED:

[Signature]
Laurie O'Brien, PhD
Co-Director of Thesis

[Signature]
Steven M. Sheffrin, PhD
Co-Director of Thesis

[Signature]
Chad Van Schoelandt, PhD
Third Reader
Abstract

Prior research has demonstrated that formal education is positively associated with lower self-reported intergroup prejudice towards many outgroups, including racial/ethnic outgroups. Two intergroup ideological attitudes, right-wing authoritarianism (RWA) and social dominance orientation (SDO), largely mediate this relationship, such that better educated individuals tend to report lower SDO and RWA, which are related to lower self-reported intergroup prejudice. Given this prior research, this study investigated the link between formal education and intergroup behavior displayed in an economic decision-making game, and how intergroup ideological attitudes mediated this relationship. A two-player Public Goods Game (PGG) with racial/ethnic ingroup and outgroup members was employed as a behavioral measure, because the PGG requires a player to cooperate in the face of a risk of defection to get better payoffs. Participants were always White Americans and had either a White (ingroup) or a Black (outgroup) game partner. The results indicated that there was no significant difference in contributions in the PGG between those with a Black game partner and those with a White game partner, and formal education did not significantly predict contributions in the PGG. Further, there was no significant interaction between formal education and game partner ethnicity. Finally, neither SDO nor RWA mediated the effect of formal education on contributions in the outgroup condition and not in the ingroup condition. Given these null results, explanations and future directions are discussed.

Keywords: formal education, public goods game, RWA, SDO, intergroup prejudice
# Table of Contents

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction</td>
<td>1</td>
</tr>
<tr>
<td>Method</td>
<td>11</td>
</tr>
<tr>
<td>Results</td>
<td>16</td>
</tr>
<tr>
<td>Discussion</td>
<td>17</td>
</tr>
<tr>
<td>References</td>
<td>23</td>
</tr>
<tr>
<td>Tables and Figures</td>
<td>31</td>
</tr>
<tr>
<td>Appendices</td>
<td>32</td>
</tr>
</tbody>
</table>
Formal Education and Intergroup Behavior

Inclusivity and diversity are virtues that America and most of its schools hold as central values. However, the extent to which the American education system promotes diversity and inclusivity remains only partially answered in the psychological literature. One way this question has been examined is in studying the association between formal education and intergroup prejudice.

One clear finding has emerged for the formal education-intergroup prejudice relationship: greater formal education is associated with lower intergroup prejudice towards many traditionally marginalized outgroups on self-report measures (e.g., Greeley and Sheatsley, 1971; Hello, Scheepers, & Sleegers, 2006; Maykovich, 1975; Quillian, 1995; Stouffer, 1955; Wagner & Zick, 1995). For racial, ethnic, and immigrant outgroups, this relationship has been observed in different countries across time for an array of dependent variables: the intention to keep distance from ethnic minorities (Hello et al., 2006), attitudes towards immigrants and immigration policy (Cavaillé & Marshall, 2019; Coender, Lubbers, & Scheepers, 2008; Quillian, 1995), ethnic exclusion (Coenders & Scheepers, 2003), ethnocentrism (Meeusen, de Vroome, and Hooghe 2013) and racial prejudice (Carvacho et al., 2013; Federico, 2004, 2005; Quillian, 1995; Wagner & Zick, 1995). Formal education is also related to lower self-reported prejudice against other outgroups including sexual minorities (Carvacho et al., 2013; Napier & Jost, 2008), homeless and disabled individuals (Carvacho et al., 2013), obese individuals (Hilbert, Rief, and Braehler 2008), and religious outgroups (Carvacho et al. 2013). Notably, however, this relationship does not extend to all outgroups as the well-educated tend to
exhibit greater self-reported prejudice towards the less educated (Kuppens, Spears, Manstead, Spruyt, & Easterbrook, 2018) and political outgroups (Henry & Napier, 2017).

**Ingroup Favoritism vs. Outgroup Derogation**

Intergroup prejudice can be understood as stemming from ingroup favoritism, outgroup derogation, or a combination of the two. It is often ambiguous whether an attitude that preferences one’s group over another or derogates another group over one’s group ultimately comes from a like of the ingroup or a dislike for the outgroup. Thus, ingroup favoritism and outgroup derogation are often not disentangled in measures of intergroup prejudice since a reference to both the ingroup and outgroup is implicit in many of the items. However, in studies assessing the effect of formal education on intergroup prejudice, measures of intergroup prejudice, when looking at the item content, appear to more closely assess outgroup derogation, some even to the point of appearing to entirely assess outgroup derogation. For example, measures used in studies of formal education that assess direct liking of outgroups (e.g., Carvacho et al., 2013; Hilbert et al., 2008; Wagner & Zick, 1995) or ethnic distance (e.g., Hello et al., 2006) have also been used as measures of outgroup derogation (e.g., Obaidi, Kunst, Kteily, Thomsen, & Sidanius, 2018; Oswald, 2005; Schlueter, Schmidt, & Wagner, 2008). Since the well-educated tend to show significantly lower scores on these types of measures, then the formal education-intergroup prejudice relationship is likely driven, at least in part, by a decline in outgroup derogation.

Prior evidence suggests that perception of threatened group interests from an outgroup leads to outgroup derogation (Böhm, Rusch, & Gürerk, 2016; Obaidi et al., 2018; Oswald, 2005; Schlueter et al., 2008). For example, using a longitudinal study of
multiwave panel surveys from Russia and Germany, Schlueter, Schmidt, and Wagner (2008) tested the directionality of how perceived threat and outgroup derogation interact. They found that perceptions of threatened group interests from an outgroup were causally antecedent to Russians’ preferred ethnic distance towards minorities as well as Germans’ negative behavioral intentions and dislike of foreigners.

When applied to the relationship between formal education and outgroup derogation, perceived threat of the outgroup has been shown to act as both a mediator and moderator. In a Dutch sample, Hello et al. (2006) showed that perceived threat acted as a mediator such that well-educated individuals perceived less threat from ethnic minorities that led them to be less inclined to keep ethnic distance. Since ethnic distance has been used as a measure of outgroup derogation (Schlueter et al., 2008), this study shows that perceived threat mediates the relationship between formal education and outgroup derogation. Meanwhile, in a study of twelve European countries, Qullian (1995) found that perceived threat acted as a moderator such that formal education reduced intergroup prejudice more in countries where perceived threat to the dominant group was greater. This study, however, only assessed intergroup prejudice broadly and not outgroup derogation specifically. Regardless, given the literature, the change in intergroup prejudice is likely driven by a change in outgroup derogation. In total, when perceived threat of the outgroup is present, greater formal education reduces outgroup derogation, via reducing perceived threat of the outgroup, to a greater degree than when perceived threat of the outgroup is absent.

Meanwhile, the extent to which ingroup favoritism underlies the formal education-intergroup prejudice relationship is not well outlined in the literature. In a
survey of twenty-two countries, Coenders and Scheepers (2003) analyzed the roles of two forms of ingroup favoritism, chauvinism and patriotism, in the formal education-intergroup prejudice relationship. Chauvinism is the blind attachment to the perspective that one’s own country and racial/ethnic ingroup are superior and unique, while patriotism is the pride in and love for one’s own country and racial/ethnic ingroup based on critical understanding. Coenders and Scheepers (2003) found that formal education level is strongly negatively related to chauvinism but not patriotism. Thus, this study supports that formal education is related to ingroup favoritism via a reduction in chauvinism. However, Kolstad & Wiig (2013) found evidence that calls this conclusion into question. In a study analyzing cooperation in an economic decision-making game at an Angolan microcredit institution, Kolstad & Wiig (2013) found that the well-educated tended to show more intergroup bias toward those in the same credit group than the less-educated due to more ingroup favoritism. In total, the extent to which the formal education-intergroup prejudice relationship functions through ingroup favoritism remains understudied and unclear.

### Intergroup Ideological Attitudes as Mediators

The intergroup ideological attitudes fostered through formal education appear to largely mediate the relationship between formal education and self-reported intergroup prejudice (Carvacho et al., 2013; Hello et al., 2006; Pettigrew, Wagner, & Christ, 2007). The dual-process motivational model (e.g., Duckitt, 2006; Duckitt & Sibley, 2007) separates these intergroup ideological attitudes into two relatively independent dimensions best captured by social dominance orientation (SDO) and right-wing authoritarianism (RWA).
SDO (e.g., Ho et al., 2015) is a measure of attitudes towards group-based hierarchy and inequality and contains two subdimensions: dominance and anti-egalitarianism. The dominance dimension constitutes a preference for systems of group-based dominance in which lower status groups are oppressed by high status groups, while the anti-egalitarianism dimension constitutes a preference for systems of group-based inequality perpetuated by hierarchy-enhancing social policies and ideologies. Meanwhile, RWA (e.g., Altemeyer, 2006) is a measure of attitudes towards submitting to established authorities and norms, and towards those who do not submit to them. RWA has three components: authoritarian submissions, conventionalism, and authoritarian aggression. Authoritarian submission constitutes a preference for submitting to established authorities, while conventionalism constitutes a preference for adherence to established norms and traditions. Finally, authoritarian aggression constitutes a preference for tough responses to violations of social norms and affronts to established authorities.

Both intergroup ideological attitudes are moderately to strongly positively associated with self-reported intergroup prejudice (e.g., Duckitt, 2006; Duckitt & Sibley, 2007). Further, Carvacho et al. (2013) conducted two cross-sectional surveys in Europe and two longitudinal studies in Germany and Chile over the phone with large samples to analyze SDO and RWA as mediators of the formal education-intergroup prejudice relationship. In these studies, they employed shortened SDO and RWA scales as well as short scales of intergroup prejudice for groups including: Muslims, Jews, foreigners, homeless individuals, people with disabilities, homosexual people as well as other races appropriate to the particular country being studied. They observed that both SDO and RWA, though RWA more consistently, mediated the relationships between these forms
of intergroup prejudice and formal education. In other words, the well-educated tended to hold more egalitarian and less traditional attitudes that, in turn, were associated with lower self-reported intergroup prejudice.

**The Public Goods Game**

Research evidences a correlational relationship between formal education and intergroup prejudice. However, the link between formal education and intergroup behavior has not been well explored. Cooperation displayed in a two-player public goods game (PGG) is one such way to analyze intergroup behavior. In this economic decision-making game, players must decide how much money to contribute to a public good that subsequently benefits both players equally. The group’s payoff is maximized if both players contribute to the public good. However, if one player contributes while the other does not, the contributor benefits less than the free-rider from the public good to the point of being better off having never contributed at all. Therefore, the PGG tests the willingness of a player to cooperate in the face of a risk of defection (e.g., Fischbacher, Gächter, & Fehr, 2001). Indeed, the PGG with varying player counts has been used as a measure of intergroup behavior (e.g., Castro, 2008; Chakravarty & Fonseca, 2014; De Cremer & Van Vugt, 1998, 1999, 2002; Dijkstra, 2013; Jackson, 2008; Koopmans & Rebers, 2009; Parks, Sanna, & Berel, 2001; Tusicisny, 2017; Van Vugt & De Cremer, 1999; Van Vugt, De Cremer, & Janssen, 2007; Van Vugt & Hart, 2004).

**Economic Games and Formal Education**

As far as the author is aware, no study has yet tested the relationship between formal education and intergroup behavior in the PGG directly. However, prior research has found mixed evidence for the relationship between formal education and general
cooperation with players with no group affiliation, as well as the relationship between formal education and cooperation with ingroup vs outgroup members. For the former, the well-educated tended to play more cooperatively in an all-or-nothing dictator game in a Dutch population (Bekkers, 2007), while in a Japanese population, the well-educated tended to play less cooperatively in a series of theoretical dictator games (Ogawa & Ida, 2015). Further, those educated in economic fields tend to behave less cooperatively in similar economic decision-making games, including the dictator and ultimatum games, than those in other fields of study (Carter & Irons, 1991; Miller, 1999; Wang, Malhotra, & Murnighan, 2011). Thus, the relationship between formal education and general cooperation in economic decision-making games is complex and not well understood.

In analyzing the relationship between formal education and cooperation with ingroup vs outgroup members, Kolstad & Wiig (2013) studied intergroup behavior in a series of dictator games at an Angolan microcredit institution. They found that the well-educated tended to show more intergroup bias toward those in the same credit group than the less-educated. This study, therefore, may be indicative of the restrictions on the type of outgroups where greater formal education is associated with more cooperative behavior.

In total, mixed evidence in the relationship between formal education and behavior in other economic decision-making games may indicate that this relationship is complex and varies with context, including population recruited, economic game used, and group membership information given to the players. Given this complexity, how formal education is related to intergroup behavior in the two-player PGG is an interesting question for additional investigation.
The Present Study

The present study assesses the relationship between formal education and contributions in a two-player PGG with outgroup versus ingroup members and analyzes SDO and RWA as mediators of this relationship. Balliet, Wu, & De Dreu (2014) conducted a meta-analysis of 212 studies that analyzed what factors of an economic game lead to greater intergroup bias. They found that economic decision-making games that (1) require interdependence, (2) where players act simultaneously, and (3) where group membership is common knowledge invoke the greatest intergroup bias. In the present research, these criteria were satisfied by using a simultaneous two-player PGG where racial/ethnic group membership was known and manipulated. Specifically, only White participants were recruited, while the other “player” was artificially designated as White or Black.

This method was thought to potentially strengthen the relationships between SDO and RWA with contributions in the PGG. Haesevoets, Folmer, and Van Hiel (2015) showed that SDO and RWA correlated to a small to moderate degree with contributions in a PGG that lacked reference to group membership. However, since SDO and RWA are more strongly related to intergroup attitudes than attitudes towards individuals (e.g., Duckitt, 2006; Duckitt & Sibley, 2007), assigning each participant’s game partner to an outgroup versus an ingroup was thought to potentially better prompt intergroup attitudes tied to SDO and RWA in the decision-making process in the PGG. Therefore, this method was thought to, perhaps, strengthen the degree to which contributions in the PGG constitute a measure of intergroup behavior and, thus, strengthen the relationships between SDO and RWA with contributions in the PGG.
Additionally, this method affects the degree to which ingroup favoritism and outgroup derogation can be measured. The intergroup bias observed in PGGs with three or more players appears to largely stem from ingroup favoritism (Balliet, Wu, & De Dreu, 2014; De Cremer, D., & Van Vugt, M., 1998, 1999; Jackson, 2008; Koopmans & Rebers, 2009), and not outgroup derogation (Koopmans & Rebers, 2009). For example, in an online study, Koopmans and Rebers (2009) used a six-player PGG to assess the intergroup bias between political groups and between religious groups. They found evidence that the intergroup bias displayed within the political groups and religious groups was due to ingroup favoritism and not outgroup derogation. However, as far as the author is aware, no study has yet assessed the roles of ingroup favoritism and outgroup derogation in a two-player PGG specifically.

For assessing ingroup favoritism, a two-player PGG may deviate from those with more players due to group membership salience. Consistently, greater group membership salience leads to greater intergroup bias in the PGG (Chakravarty & Fonseca, 2014; De Cremer, D., & Van Vugt, M., 1998, 1999; Jackson, 2008). In a two-player PGG, group membership salience is minimized in the ingroup condition (when the White participant is playing with a White game partner) but maximized in the outgroup condition (playing with a Black game partner). While in the outgroup condition there is a player with a contrasting race/ethnicity, there is no such contrast to make group membership salient in the ingroup condition, as would be possible in a PGG with three or more players. While it was thought possible that this lack of group membership salience in the ingroup condition could result in a lack of ability to capture ingroup favoritism, prior evidence suggests that an explicit outgroup in economic decision making games may not be necessary for
ingroup favoritism to occur, especially in cooperative games like the PGG (See Balliet, Wu, & De Dreu, 2014). Therefore, a two-player PGG was thought to be able to assess ingroup favoritism. Thus, if there was an effect of formal education on ingroup favoritism, then the two-player PGG was thought to be able to assess it; though, a lack of prior research on the formal education-ingroup favoritism relationship limits the ability to make a specific non-null prediction.

Meanwhile, in the outgroup condition, group membership was thought to be salient in a two-player PGG, similarly to those with more players, and potentially prompt outgroup derogation if participants suspected that their Black game partner would defect. For example, one of the negative stereotypes of Black Americans is that they don’t try hard enough, and, thus, they take what they don’t deserve through programs like welfare (e.g., Brown-Iannuzzi, Dotsch, Cooley, Payne, 2017; Federico 2004, 2005) and affirmative action (e.g., Federico & Sidanius, 2002). Due to stereotypes like this, participants were suspected to perceive a greater threat of free-riding when playing with a Black game partner. Thus, outgroup derogation was thought to be more likely when playing with a Black game partner compared to a different outgroup, such as the religious and political groups assessed by Koopmans & Rebers (2009) in which outgroup derogation was not observed. Therefore, greater formal education could affect outgroup derogation in the two-player PGG by affecting adherence to certain negative stereotypes of Black Americans. Indeed, the well-educated tend to hold less of these negative stereotypes of Black Americans associated with welfare and affirmative action (Federico, 2004, 2005). In total, a two-player PGG with White vs Black game partners was thought
to assess the effect of formal education on ingroup favoritism and outgroup derogation of Black Americans.

In total, I predicted (1) individuals would contribute more to the public good when their game partner was an ingroup member (White) than an outgroup member (Black), (2) there would be an interaction between formal education and group membership such that formal education would be associated with contributions in the outgroup condition but not in the ingroup condition, and (3) using a moderated mediation model, SDO and RWA would mediate the effect of formal education on contributions in the outgroup but not ingroup condition. See Figure 1.

Method

Participants

There were 426 participants in the present study, after exclusions. G*Power was used to determine sample size, power = .80, alpha = .05 and effect size $f^2 = .02$. I chose to calculate power based on the ability to detect a change in $R^2$ in a regression model based on three tested predictors (Faul, Erdfelder, Lang, & Buchner, 2007). This analysis suggested that 395 participants were needed. However, to account for participants who would be excluded from analysis or would not qualify to play to the PGG, 530 participants were recruited.

The subject population was recruited through Amazon's Mechanical Turk (MTurk), and the name of the study was posted online on the MTurk platform. In order to qualify, participants had to self-identify as ethnically White, have an MTurk account, be at least 18 years of age, speak English, and be physically located in the U.S. The Turk Prime platform was used to recruit participants so that participants were unaware of how
they qualified to be in the study (Litman, Robinson, & Abberbock, 2016). People who were interested in participating could click on a link to complete the questionnaire.

Of the 426 participants remaining after exclusions, the sample ranged in age from 18 to 82 \( (M = 40.30, SD = 13.14) \) and was composed of 197 males, 229 females. The sample included individuals spanning the socioeconomic ladder. When asked to indicate the rung where they stand at this time in their life, relative to other people in the United States on the socioeconomic ladder (1 = ‘bottom rung’, 10 = ‘top rung’), participants’ placements ranged from 1 to 9 \( (M = 4.79, SD = 1.73) \). The median income range indicated for the sample was twenty-five to fifty thousand dollars with 27.7% indicating this income range. When asked to indicate their highest level of formal education, 1.2% did not complete high school or obtain a GED, 22.8% earned a high school diploma or GED, 14.8% had some college but no degree, 4.2% earned a post-secondary vocational certificate, 11.7% earned an associate’s degree, 29.3% earned a bachelor’s degree, 3.1% had some graduate school but no degree, 11.7% earned a master’s degree, and 1.2% earned a doctoral degree or another advanced degree (Ph.D., JD., MD).

**Procedure and Measures**

Participants who were interested in participating clicked on a link to the consent script (See Appendix A). If they decided to participate, they clicked “continue” and began the study. Participants first completed a short demographic questionnaire (See Appendix B) and then received instructions on how to play the PGG (See Appendix C). Two simple comprehension questions were asked to ensure that the participant understood the game. Participants who correctly answered these questions qualified to
play the PGG. If a participant did not qualify to play the PGG, they were paid $.50 for their participation.

Participants who qualified to participate in the PGG were instructed to choose an avatar from an array of emojis of White faces of varying appearances (See Appendix D). After choosing an avatar, the participant was told to create a username for the purposes of the study and then told to wait while they were “paired” with another player. Participants then played one PGG in which they were randomly assigned to be presented with a fictitious game partner who either appeared to be a Black American or a White American, as their names (Freyer & Levitt, 2004) and avatars suggested (See Appendix E).

Following the game, participants were asked if they had played a similar game before, and a manipulation check was conducted in which the participant was asked what ethnicity and gender they believed the other player was (See Appendix F). Then, they answered a question asking how conservative-liberal they were. Next, they completed the 16-item SDO scale (Ho et al., 2015) and 22-item RWA scale (Altemeyer, 2007). Finally, participants viewed debriefing information (See Appendix G). The entire study took approximately 10-minutes. Participants who completed the entire experiment were paid $.50 as a show-up fee and a $1.50 bonus for qualifying to play the PGG and completing the entirety of the study.

**Formal Education.** Participants indicated their highest level of formal education on a 9-point scale. In data analysis, this 9-point scale was condensed into a 5-point scale. Having not completed high school or obtained a GED is indicated by 1. Having earned a high school diploma or GED is indicated by 2. Having had some college but no degree,
having earned a post-secondary vocational certificate, or having earned an associate’s degree is indicated by 3. Having earned a bachelor’s degree is indicated by 4. Finally, having had some graduate school but no degree, having earned a master’s degree, or having earned a doctoral degree or another advanced degree (Ph.D., JD., MD) is indicated by 5.

**Contributions in the Public Goods Game.** Participants indicated their contributions to the public good on a $0-1.00 scale with specificity to the cent.

**Social Dominance Orientation Scale.** The SDO scale (Ho et al., 2015) contains 16 items in which participants were asked to show how much they favor or oppose each idea. Examples of items are “Some groups must be kept in their place” and “No one group should dominate in society”. The answers were indicated on a 7-point Likert scale ranging from Strongly Oppose (1) to Strongly Favor (7). The scale demonstrated adequate reliability, (α = .95).

**Right-Wing Authoritarianism Scale.** The RWA scale (Altemeyer, 2007) contains 20 items in which participants were asked to show how much they agree or disagree with each statement. Examples of items are “The ‘old-fashioned ways’ and the ‘old-fashioned values’ still show the best way to live” and “What our country really needs is a strong, determined leader who will crush evil, and take us back to our true path”. The answers were indicated on a 9-point Likert scale ranging from Disagree Strongly (1) to Agree Strongly (9). The scale demonstrated adequate reliability, (α = .96).

**Income.** Participant income was measured on a 12-point scale that ranges from <10K to >750K.
“Subjective” Socioeconomic Status (SES). “Subjective” SES was measured using an image of a ladder and asking participants to place themselves on the ladder relative to others in the U.S., using a scale that ranges from 1 (lowest) to 10 (highest).

Gender. Participants indicated their gender utilizing three categories: male, female, and “other: please specify”. Because participants were paired with an artificial game partner of the same gender, participants who indicated “other: please specify” were excluded from the sample.

Data Cleaning

In total, 530 participants consented to take part in the study. Of these participants, 31 were excluded because they self-identified as being an ethnicity other than solely White, two were excluded because they self-identified as being a gender other than male or female, and one was excluded because they did not report their gender. Of the remaining participants, 53 were excluded because they did not answer both PGG instruction comprehension checks correctly. Of the participants who qualified to play the PGG, two dropped out of the study, two did not indicate a contribution in the PGG, one did not consent to the use of their data, and seven did not respond to the question asking for consent to the use of their data. Finally, I decided to exclude five more participants because, in the comment section, they indicated suspicion that the other player was artificial. This left a total of 426 participants in the sample.

Additionally, the distributions for RWA, SDO, and income were checked for outliers. Scores that were more than three standard deviations away from the mean were winsorized.
Results

Manipulation Check

A chi-square test of independence was performed to examine the relationship between condition (having a Black or White game partner) and what race/ethnicity the participant believed their game partner was after playing the PGG. The relation between these variables was significant, $X^2(2) = 264.42, p < .001$. Participants with a Black game partner correctly identified their game partner’s race/ethnicity (78.0%) significantly less often than those with a White game partner (97.7%).

Primary Analyses

To test the prediction that individuals would contribute more when the other player was an ingroup member than an outgroup member, a two-tailed independent samples t-test was conducted. Inconsistent with this prediction, no significant difference in contributions in the PGG between those with a Black game partner ($M = .62, SD = .31$) and those with a White game partner ($M = .66, SD = .31$) was found, $t(424) = -1.45, p = .148$.

To test the prediction that there would be an interaction between formal education and group membership such that formal education would be associated with contributions in the outgroup condition but not in the ingroup condition, a two-tailed, multiple regression analysis was conducted. Specifically, contributions in the PGG were regressed on formal education level, the manipulation (ingroup vs. outgroup game partner), and their interaction. Following the recommendations of Aiken & West (1991), formal education level was first centered before performing the regression analysis. The model was insignificant, $R^2 = .006, F(3, 422) = .83, p = .478$. See Table 1. Inconsistent with the
prediction, the interaction term did not significantly predict contributions in the PGG, $\beta = .04, p = .548$. Further, formal education level did not significantly predict contributions in the PGG, $\beta = -.04, p = .543$. Likewise, having a Black versus a White game partner did not significantly predict contributions in the PGG, $\beta = .07, p = .150$.

To test the prediction that SDO and RWA would mediate the effect of formal education on contributions in the outgroup but not ingroup condition, first, two-tailed Pearson correlations between formal education, RWA, SDO, and contributions in the PGG were calculated. See Table 2. Contributions in the PGG were significantly negatively correlated with RWA, $r = -.13, p = .009$, and SDO, $r = -.13, p = .006$. Formal education was significantly positively correlated with RWA, $r = -.11, p = .018$. However, formal education was not significantly correlated with SDO, $r = .01, p = .826$. Therefore, the preconditions for running the custom model in Figure 1 were not met. Rather, a model in which only RWA was tested as a mediator could be run. Specifically, a bootstrapping procedure was used to test the moderated mediation predictions involving only RWA as a mediator in Model 15 in the PROCESS macro developed for SPSS by Hayes (Hayes, 2017). There was no evidence of moderated mediation, index of moderated mediation $= .003, 95\%$ CI $[-.004, .012]$. That is, there was no evidence that the indirect effect of formal education on contributions in the PGG differed by condition.

**Discussion**

The present study sought to examine the association between formal education and intergroup behavior. Previous work has so far established a reliable relationship between formal education and self-reported intergroup prejudice, but there is mixed evidence that this translates to actual intergroup behavior in economic decision-making.
games. Given that in America and most of its schools, both inclusivity and diversity are central values, understanding how formal education relates to intergroup behavior is integral for assessing the extent to which these values are truly upheld.

The results showed that, inconsistent with my first prediction, no significant difference in contributions in the PGG was found between those with a Black game partner and those with a White game partner. This absence of intergroup bias can stem either from a parallel absence of ingroup favoritism and outgroup derogation or from them functioning in opposite directions. The latter is unlikely because there is no reason to suspect ingroup derogation or outgroup favoritism, so the former is more plausible. Individuals tend to generally exhibit ingroup favoritism, which has been consistently shown in PGGs with three or more players (De Cremer, D., & Van Vugt, M., 1998, 1999; Jackson, 2008; Koopmans & Rebers, 2009). Thus, the lack of group membership salience in the ingroup condition (playing with a White game partner) of the two-player PGG utilized in the present study likely prevented ingroup favoritism. Meanwhile, a lack of outgroup derogation is likely evident that negative stereotypes which White Americans hold toward Black Americans do not extend to perceiving a greater threat of free-riding when playing with a Black game partner and, thus, do not extend to cooperating less with them in the PGG. In their study of intergroup behavior using a two-player PGG as well, Tusicisny (2017) similarly found no significant difference in contributions by Hindu participants when playing with Hindu versus Muslim game partners, likely for similar reasons.

Notably, participants with a Black game partner correctly identified their game partner’s race/ethnicity less consistently than those with a White game partner. Initially,
this may appear to provide refuting evidence for the conclusion that group membership salience was too low in the ingroup condition (playing with a White game partner) to prompt ingroup favoritism and high enough in the outgroup condition (playing with a Black game partner) to prompt outgroup derogation. However, it is not clear how close the link is between being able to recall the game partner’s race/ethnicity after the fact and factoring in the game partner’s race/ethnicity into the decision-making process of the PGG. This link becomes less clear when considering, for example, that group membership may play into the decision-making process without conscious awareness (e.g., Kleiman & Hassin, 2011), and “White” is likely the default guess for most participants. Therefore, the conclusions drawn from assessment of the first prediction likely hold.

Next, inconsistent with my second prediction, there was no evidence for an interaction between formal education and group membership such that formal education would be associated with contributions in the outgroup condition (playing with a Black game partner) but not in the ingroup condition (playing with a White game partner). Additionally, formal education did not exhibit a main effect on contributions in the PGG. Therefore, formal education did not affect contributions in the PGG overall and there were similarly null effects of formal education on contributions in the ingroup and outgroup conditions. This is likely for similar reasons that the first prediction was not supported. Again, a lack of group membership salience in the ingroup condition of the two-player PGG likely inhibited ingroup favoritism. Therefore, the effect of formal education on ingroup favoritism, independent of if formal education would even affect ingroup favoritism, was likely unable to be assessed in the ingroup condition.
Meanwhile, a null effect of formal education on outgroup derogation in the outgroup condition is likely evident that there is no difference between well-educated White Americans and less-educated White Americans in their perception of the threat of free-riding when playing with a Black game partner and thus, no difference in outgroup derogation. However, this conclusion should be understood within the context that there was no net outgroup derogation among players with differing levels of formal education in the first place. Therefore, a null effect of formal education on outgroup derogation only shows that some level of formal education didn’t promote outgroup derogation while another balanced this out by promoting outgroup favoritism, which was already unlikely given the previous literature.

Finally, inconsistent with my third prediction, neither SDO nor RWA mediated the effect of formal education on contributions in the outgroup but not in the ingroup condition. Prior research evidences that, through SDO and RWA, greater formal education leads to a decline in intergroup prejudice on self-report measures, and this decline is likely at least partially driven by a decline in outgroup derogation. Thus, it was suspected that SDO and RWA would mediate any decline in outgroup derogation in the outgroup condition associated with greater formal education. Therefore, because formal education did not affect outgroup derogation, a null outcome is unsurprising.

**Limitations and Future Directions**

Several limitations to this study are at play. First, because participants who did not understand the instructions of the PGG may have tended to be less educated, less educated individuals may have been disproportionately screened out. To test this possibility, I used an independent samples, two-tailed t-test and found a significant
difference in formal education level between those who answered both PGG instruction comprehension checks correctly ($M = 3.35, SD = 1.04$) and those who did not ($M = 2.94, SD = 1.01$), $t(494) = -2.67, p = .008$, such that those who answered the checks correctly tended to be better-educated than those who did not. This shows that a selection effect was present in the study.

Secondly, participants did not play against real players who are part of an ingroup or outgroup, but only emojis and names were used to depict them. This design may have led some participants to correctly believe that their game partner was not real. Indeed, five participants voluntarily indicated such suspicion in the comment section. Therefore, though allowing for greater internal validity with the ability to directly manipulate the characteristics of the game partner, this design came at the cost of ecological validity.

In light of these limitations, there are several considerations for further investigation. First, ingroup favoritism was not adequately measured likely due to a lack of group membership salience in the ingroup condition of the two-player PGG. Therefore, future studies should consider increasing group membership salience in the ingroup condition. This can be achieved by, for example, utilizing a PGG with more than two players so that group membership can be made more salient through the presence of at least one outgroup member (one Black game player in this case) in both conditions. Additionally, future studies should take steps to attenuate or even eliminate a selection effect by formal education level when assessing comprehension of the PGG, such as including a practice round with feedback for participants to become acquainted with the game.
Finally, the roots of intergroup bias, ingroup favoritism and outgroup derogation, have been understudied in the literature assessing the effects of formal education. Though a decline in outgroup derogation and a decline in ingroup favoritism have identical effects in the decline of intergroup bias, the interpretation and resulting conclusions differ greatly. Though the present study attempted to make a distinction between ingroup favoritism and outgroup derogation, this is only one of a handful of studies of the formal education-intergroup bias relationship that does so. Thus, future studies should consider including measures that distinguish between ingroup favoritism and outgroup derogation to more holistically assess the effects of formal education.
References


doi:10.1093/poq/nfx038


doi:10.1038/oby.2008.263


doi:10.1177/1046496408322761


doi:10.1016/j.evolhumbehav.2009.01.003


Table 1
Contributions in the PGG Regressed on Formal Education Level, Condition, and Their Interaction

<table>
<thead>
<tr>
<th></th>
<th>Contributions in the PGG</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$B$</td>
</tr>
<tr>
<td>Constant</td>
<td>.62***</td>
</tr>
<tr>
<td>Education</td>
<td>-.01</td>
</tr>
<tr>
<td>Condition</td>
<td>.04</td>
</tr>
<tr>
<td>Education $\times$ Condition</td>
<td>.02</td>
</tr>
</tbody>
</table>

Note.  *** = $p < .001$. A two-tailed test was used. PGG = public goods game. $SE B$ = standard error of $B$. 
Table 2
*Pearson Correlations*

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Formal Education</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. SDO</td>
<td></td>
<td>.01</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. RWA</td>
<td></td>
<td>-</td>
<td>-.12*</td>
<td>.63**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Contributions in PGG</td>
<td>-.02</td>
<td>-.13**</td>
<td></td>
<td>-.13**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Subjective SES</td>
<td></td>
<td>-</td>
<td>.42**</td>
<td>.21**</td>
<td>.11*</td>
<td>-.01</td>
</tr>
<tr>
<td>6. Income</td>
<td></td>
<td>-</td>
<td>.34**</td>
<td>.16**</td>
<td>.03</td>
<td>.02</td>
</tr>
</tbody>
</table>

Note. * = p < .05. ** = p < .01. A two-tailed test was used. PGG = public goods game; SES = socioeconomic status.
Figure 1. Custom moderated mediation model used in the PROCESS macro developed for SPSS by Hayes (2017).
Appendix A

Consent Script

What is the research study and why is it being done?

You are invited to participate in a research study on economic behavior and attitudes. You are being asked to participate in this research study because we want to learn about how people of varying attitudes behave in economic situations. Some research requires that the full purpose of the study not be explained before you participate. We will explain in greater detail what we hope to learn from this study at the end of the study.

What will you do if you participate in the study?

You will be asked some brief demographic questions and then you will learn about the details of an economic game. You will be asked about your understanding of the game. If you qualify to participate in the economic game, you will play the game and then answer some additional questions about your attitudes.

Your participation will take approximately 10 minutes.

What are the possible risks from being in the study?

There are no foreseeable risks to participants.

What are the possible benefits from being in the study?

We cannot and do not guarantee or promise that you will receive any benefits from this study. We hope that your participation will help us gain a better understanding of how people of varying ideologies behave in economic situations.

If you take part in this study, how will we protect your privacy?
If you have read this form and have decided to participate in this project, please understand your participation is voluntary and you have the right to withdraw your consent or discontinue participation at any time without penalty or loss of benefits to which you are otherwise entitled. The alternative is not to participate. You have the right to refuse to answer particular questions. The results of this research study may be presented at scientific or professional meetings or published in scientific journals. Your individual privacy will be maintained in all published and written data resulting from the study. When the study is complete, the anonymous data file will be stored in a data repository and be made available to other researchers.

**Will you be paid to take part in the study?**

You will receive $0.50 credit on Amazon’s Mechanical Turk for completing the demographic questionnaire and answering questions about your understanding of the game. If you are invited to play the economic game, you will have an opportunity to earn an additional bonus worth $.75 - $1.75.

**What if you have questions or concerns about the study?**

Take as much time as you like before you make a decision to participate in this study. If you have any questions or concerns about the study, whether before or after agreeing to participate, you can contact the study Principal Investigator, Gregory Chauvin, gchauvin@tulane.edu, or the Faculty Advisor supervising this study, Dr. Laurie O’Brien, at (504) 862-3320. You can call about any matter having to do with the study, including complaints or questions about your rights as a study participant.
If you want to speak with someone who is not directly involved in the study, you may call the Tulane University Human Research Protection Office at (504) 988-2665 or email irbmain@tulane.edu.

**Consent**

Please print a copy of this page for your records. If you agree to participate in this research, please press the green arrow to continue.
Appendix B

Demographics

1. What is your gender?
   ___ Male
   ___ Female
   ___ Other (Feel free to specify): ___

2. How old are you? ___

3. How would you describe your race/ethnicity? (Please check all that apply).
   ___ Asian/Asian American
   ___ Black/ African American
   ___ Indigenous Nation / Native American
   ___ Latino(a) / Hispanic American
   ___ White/European American
   ___ Other (please specify): ___

4. Please check the category that tells us your approximate total family income for 2018. Consider all sources of income, including earnings, welfare cash assistance, child support, alimonies, support from other members of your household who regularly contribute to your household, etc.

<table>
<thead>
<tr>
<th>(1) &lt; 10 K</th>
<th>(2) &gt; 10–15 K</th>
<th>(3) &gt; 15–25 K</th>
<th>(4) &gt; 25–50 K</th>
</tr>
</thead>
<tbody>
<tr>
<td>(5) &gt; 50–75 K</td>
<td>(6) &gt; 75–100 K</td>
<td>(7) &gt; 100–150 K</td>
<td>(8) &gt; 150–200 K</td>
</tr>
<tr>
<td>(9) &gt; 200–250 K</td>
<td>(10) &gt; 250–500 K</td>
<td>(11) &gt; 500–750 K</td>
<td>(12) &gt; 750 K</td>
</tr>
</tbody>
</table>
5. Please indicate your highest level of education.

0 = did not complete high school or obtain GED

1 = high school diploma or GED

2 = Some college but no degree

3 = postsecondary vocational certificate

4 = associate’s degree

5 = bachelor’s degree

6 = Some graduate school but no degree

7 = master’s degree

8 = doctoral degree or other advanced degree (Ph.D., JD., MD)

6. Please specify your area of study: ___

(if participant completed schooling beyond acquiring a high school diploma or GED)

What was your area of study in college/graduate school/vocational training? ___

(if participant completed schooling beyond acquiring a high school diploma or GED)

7. Think of this ladder as representing where people stand in the United States (your community). At the top of the ladder are the people who are the best off—those who have the most money, the most education, and the most respected jobs. At the bottom are the people who are the worst off—those with the least money, the least education, and the least respected jobs or no job. The higher up you are on this ladder the closer you are to the people at the very top; the lower you are, the closer you are to the people at the bottom.

Where would you place yourself on this ladder?
Please place a large X on the rung where you think you stand at this time in your life, relative to other people in the United States (your community).

8. What country were you born in? ___

9. If you were born outside the U.S., how long have you lived in the U.S.? ___

10. Which of the following is most accurate for you?
    a) English is my native language  b) English is my second language (ESL)
    c) Other (please specify) ___
Appendix C

Instructions to Public Goods Game

- In this 2-player economic game, you must decide what to do with $1.
- You must choose what portion, if any, to contribute to a public good and what portion, if any, to keep.
- All money contributed by each player to the public good is increased in value (multiplied by a factor of 1.5) and then divided evenly between each player.
- The sum of the money you kept plus the money you receive from the public good is the money you will receive from this game.
- The one other player who is also playing this same game with you has the same set of choices.

Example

For example:

- Both players keep $.50 and contribute $.50
- Thus $.50 + $.50 = $1 has been contributed to the public good
- Then, $1.00 x 1.5 = $1.50 is split evenly between both players, giving each player $.75
- Finally, both players receive $.75 from the public good and $.50 that each kept for a total of $1.25
Instruction Comprehension Checks

Let’s see how well you understand the directions.

If a player cooperates by contributing to the public good, then the other player will be made ___ off.

a) better   b) worse

a is correct

If a player does not cooperate by keeping their money, then the other player will be made ___ off.

a) better   b) worse

a is correct

End Screen (if participant did not qualify to continue)

Thank you for participating in the study thus far. Unfortunately, you do not qualify to continue on in the study, but you will still receive $.50 for your participation.
If you have any questions about the study, feel free to email Gregory Chauvin, gchauvin@tulane.edu, or the Faculty Advisor supervising the study, Dr. Laurie O’Brien: lobrien2@tulane.edu.
Appendix D

Avatar Selection and Username Creation

Based on your answers, we would like to invite you to continue in the study and play the economic game. Before we pair you with another participant, please choose your avatar that most closely represents you.

<table>
<thead>
<tr>
<th>Choices for Females:</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1.png" alt="Avatar Options" /></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Choices for Males:</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image2.png" alt="Avatar Options" /></td>
</tr>
</tbody>
</table>

Additionally, please create a username for the purposes of the study that your paired participant will see: ____

“Participant” Pairing

Please wait while we pair you with another participant. (Participant waited for 15 seconds)
Appendix E

Playing the Public Goods Game

You have been successfully matched with (name was inserted). (one of the avatars was shown)

Please indicate the amount you wish to allocate to the public good from $0 to $1.00.

<table>
<thead>
<tr>
<th>Condition</th>
<th>Name</th>
<th>Curly-Haired Avatar</th>
<th>Straight-Haired Avatar</th>
</tr>
</thead>
<tbody>
<tr>
<td>Black American Female</td>
<td>Shanice</td>
<td><img src="image" alt="Avatar" /></td>
<td><img src="image" alt="Avatar" /></td>
</tr>
<tr>
<td>Black American Male</td>
<td>DeShawn</td>
<td><img src="image" alt="Avatar" /></td>
<td><img src="image" alt="Avatar" /></td>
</tr>
<tr>
<td>White American Female</td>
<td>Claire</td>
<td><img src="image" alt="Avatar" /></td>
<td><img src="image" alt="Avatar" /></td>
</tr>
<tr>
<td>White American Male</td>
<td>Connor</td>
<td><img src="image" alt="Avatar" /></td>
<td><img src="image" alt="Avatar" /></td>
</tr>
</tbody>
</table>

In each condition, only participants who chose a straight-haired avatar were shown a curly-haired partner. All other participants were shown a straight-haired avatar. This was done to ensure that no participant was matched with a game partner with the same avatar.
Appendix F

Follow-up Questions and Manipulation Check

Prior Experience

Have you ever played a similar economic game before?

___Yes     ___No

Manipulation Check

What gender do you believe the other player in the economic game was?

___Male      ___Female      ___Other (Feel free to specify): ___

What race/ethnicity do you believe the other player in the economic game was?

___Asian/Asian American      ___Black/ African American

___Indigenous Nation / Native American      ___Latino(a) / Hispanic American

___White/European American      ___Other (please specify): ___

Conservatism-Liberalism

Where would you place yourself on this scale?

Extremely Liberal  Slightly Liberal  Slightly Moderate;  Middle of the Road  Slightly Conservative  Extremely Conservative

1  2  3  4  5  6  7
Appendix G

Debriefing Script

Thank you for participating in this study. In order to get the information we were looking for, we provided you with incorrect information about some aspects of this study. Now that the experiment is over, I will describe the deception to you and provide you with the opportunity to make a decision on whether you would like to have your data included in this study.

What the study really is about

In this study, we asked you to play an economic game with another player. However, we artificially created the other player to represent either a black participant or a white participant, as their name and avatar picture suggested. Our goal was to find out if knowing another person’s race affects how much money participants tend to donate to the public good. So, are people less likely to donate to the public good if the player is a member of a different race than a member of their own race? Additionally, we asked you to answer questions measuring your attitudes. Our goal was to find out if progressive and egalitarian attitudes affect how much money participants tend to donate to the public good when the other player is a member of another race compared to a member of their own race. Finally, we are also interested in whether there is a relationship between a person’s formal education and their donations to the public good.

We initially told you that you could earn between $.75 and $1.75 as a bonus for playing the economic game. Because participants are not actually paired with another partner in this study, we are automatically giving every participant a $1.50 bonus.

Taking part is voluntary
Although you have already completed the survey your involvement is still voluntary, and you may choose to withdraw the data you provided prior to debriefing, without penalty or loss of compensation offered to you. Withdrawing your submission will not adversely affect your relationship with Tulane University, the researchers, or any of our affiliates.

**Privacy/Confidentiality**

If you agree to allow us to use your data, here is how we will maintain confidentiality of the information. If you agree to let us use your data, we will keep your responses stored in a de-identified data file (i.e., a data file without your name, etc.). When the study is complete, we will store the de-identified data file in a repository where it will be made available to other researchers. You will not be identified in any publication from this study or in any data files shared with other researchers.

The main researcher conducting this study is Gregory Chauvin, an undergraduate student at Tulane University. If you have questions later, or would like to know about the results of the study, you may contact Gregory Chauvin at gchauvin@tulane.edu. Or their faculty advisor Dr. Laurie O’Brien at (504) 862-3320.

If you have any questions or concerns regarding your rights as a subject in this study, you may contact the Tulane University Human Research Protection Office at 504-988-2665 or access their website at https://www.research.tulane.edu/hrpo. You may also report your concerns or complaints anonymously online via http://www.mycompliancereport.com (access I.D. is "TUL") or by calling toll free at 1-855-546-9283.
Please indicate below if you do, or do not, give permission to have your data included in the study:

- I have been debriefed by the Research team, and I understand the true intent of and the purpose of my participation in the study title “Economic Behavior and Attitudes”. I DO give permission for the data collected during the study to be included for the purposes of the study.

- I have been debriefed by the Research team, and I understand the true intent of and the purpose of my participation in the study title “Economic Behavior and Attitudes”. I DO NOT give permission for the data collected during the study to be included for the purposes of the study.

Please feel free to share any thoughts or reactions you have regarding the study in the space below. Please do not feel obligated to leave a comment. We appreciate your time and effort!