And You think this is a game? Measuring the effect of SES and greed on unethical behavior in a decision-making game

Abstract:

Greed has been shown to be a robust determinant of unethical behavior, and previous research suggests that greed is associated with various problems, such as envy, entitlement, depression, psychopathy, and low self-esteem (Seuntjens et al., 2015; Liu et al., 2019). Past research has found conflicting effects of greed and socioeconomic status (SES) on unethical behavior using self-reported measures (Krekels, 2015; Dubois et al., 2015). In our present study, we will look at actual behavior demonstrated by participants in a game rather than using self-reported measures. We found that neither greed nor SES were significant predictors of unethical behavior, which confirmed the previous results of the study by Balakrishnan et al. (2017).

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Contents

1. Introduction	2
2. Method	4
3. Results	8
4. Discussion	13
5. Reflection	15
6. Conclusion	16
7. Bibliography	18
8. Appendix	21
9. Group Level Assessment	29

Introduction

"Earth provides enough to satisfy every man's needs, but not every man's greed."
-Mahatma Gandhi

Greed is a selfish desire for more than what's needed. This unpalatable emotion becomes even more troublesome when it's exhibited by people with relatively more resources than others, and even more so when it's accomplished unethically. As a case in point, consider the Sackler family's role in the current opioid epidemic—documents that recently became public paint an "often damning portrait of the role played by [the family]..." as they schemed to "[boost] opioid sales, even as overdoses were killing tens of thousands of Americans" (Mann, 2020). Although their opioid products (e.g. Oxycontin) were being diverted, mis-prescribed, and misused, the family "scolded company executives for not setting higher sales quotas" despite having a net worth at that time of over \$300M USD (Davison, 2010; Mann, 2020). The educational background and financial status of the Sackler family makes them a great example of the way that greed-motivated behavior carried out in an unethical way can wreak havoc on society. The magnitude of devastation brought by these situations (and others, e.g. Bernie Madoff's Ponzi scheme) make it clear that there is a sense in devoting time, effort, and consideration to the determinants of unethical behavior, especially its relationship to greed and socioeconomic status.

Socioeconomic status (SES) is an individual's relative rank in society based on wealth, occupational prestige, and education (Kraus et al., 2011). A variety of studies have been performed to address the impact of SES on unethical behavior. However, it remains unclear from these studies whether a poorer or richer socioeconomic background promotes unethical behavior. People in the lower social class live in an environment with fewer resources and higher threat and uncertainty (Adler et al., 2000; Kraus et al., 2011). It is reasonable to infer that these individuals are more likely to conduct unethical behavior to overcome their disadvantages. On the other hand, research has found that people in the higher social class have higher income and stronger sense of power which lead to more unethical behavior (Dubois et al., 2015). People with higher SES also tended to think more in terms of self-interest, and their senses of entitlement could increase greedy behavior (Razen & Stefan, 2019). Studying why well-compensated corporate executives appear more likely to exhibit unethical behavior in pursuit of their goals than their more meagerly compensated colleagues, Côte (2011) concluded that richer individuals also appear to have less social engagement and reduced need to please others and, therefore, are more likely to "make decisions that are less fair and more damaging to others."

Greed, instead, has been found as a strong determinant of unethical behavior. People motivated by greed are more likely to pursue their self interests at the cost of violating moral principles (Steinel & De Dreu, 2004). Via observational and experimental methods, studies have found that greed is associated with higher likelihood of ignoring instructions and taking candy designated for children (Zitek, 2017; Campbell, 2010). Even with the mere presence of monetary

incentives, individuals were more likely to cheat in tasks or deceive others (Gino & Pierce, 2009; Aquino et al., 2009).

The impact of SES on people's attitudes toward greed remains unclear. Individuals with higher SES were found more selfish and less altruistic since they chose to keep more laboratory credits in exchange for financial rewards than people with lower SES did (Piff et al., 2010). This suggests that people with higher SES value personal interests, and thus, greed, more heavily. Similarly, Poluektova et al. (2015) found no significant difference in dispositional greed between poor and non-poor Moscow residents. However, using a similar methodology, Liu et al. (2019) concluded that single children born to wealthier families exhibited more dispositional greed than those born to poorer families. Other research suggested that while one's SES largely influenced one's greedy behavior, this effect was largely attributable to perceptions of resource scarcity and was erased when rich and poor folks have the same perception of resource certainty (Krekels, 2015).

In short, there is presently an unclear consensus on the way in which someone's SES impacts their propensity towards greed, but there is good literature foundation for the claims that high SES and greedy disposition make people more likely to exhibit unethical behavior.

Investigating on how the rich differed from the rest of society, Piff et al. (2012) studied the impact of SES on unethical behavior. The researchers found that compared with people with low SES, people with high SES tended to conduct more unethical behavior to pursue their self interests. Specifically, Study 7 demonstrated that high SES individuals endorsed unethical behavior because of their more positive attitudes toward greed. In the experiment, participants who thought like a rich person (i.e. "greed is good") were found to have higher likelihood of engaging in unethical behavior. The paper by Piff et al. (2012) has been massively cited and mentioned by large media such as *Time* and *Wired*. Despite its huge impact, surprisingly, Balakrishnan et al. (2017) conducted a direct replication of Study 7 and found no significant results among the four pre-registered replication studies. Balakrishnan et al. (2017) also conducted a meta-analysis that included the replication studies and the original study—greed was not found to have a moderating effect on the relationship between SES and unethical behavior.

The failure of replication inspired us to look more deeply into the original study, and we found that the results of the study were largely based on self-report questionnaires. Participants were instructed to self-evaluate on how likely they were to engage in 12 listed behaviors on a scale ranging from 1 (very unlikely) to 7 (very likely). However, there could be an attitude-behavior inconsistency, as participants may not do what they said they would do (Gross & Niman, 1975). Participants also reported their subjective SES based on their real-life conditions. Since there was no control on to whom they were comparing with, participants' answers lacked comparability and thus validity.

Therefore, in the present study, we would like to continue examining the effect of SES and greed on unethical behavior yet with two major changes to the experimental design of the original study (Piff et al., 2012). Firstly, we changed the self-reported questionnaire on unethical behavior to a decision-making game that could measure actual unethical behavior. Secondly,

instead of using participants' *reported subjective SES*, we used participants' *manipulated subjective SES*. We will define *reported SES* as the actual SES reported by the participant. We used priming techniques to manipulate participants' *subjective SES*, and two conditions were available: a high-manipulated subjective SES condition and a low-manipulated subjective SES condition.

Accordingly, our experiment involved a three-stage design that was experimentally controlled for both greed and SES. In the first stage, we replicated the method used by Piff et al. (2012), which primed the participants to think in a greedy or neutral fashion. In the second stage, we randomly assigned participants to high or low SES conditions and manipulated their subjective SES through priming based on the method used by Dubois et al. (2015). In the final stage, the participants played a decision-making dice game that allowed them to actually cheat. The game was adopted from Dimant et al. (2020). In the game, we measured how much the participants have cheated using the *match score*, which represented participants' answers to the question asked in the game (yes = 1; no = 0). We then calculated participants' *matching rates*, which were the means of the *match scores*. After the game, participants filled out a demographic questionnaire.

The hypotheses of our experiment were in line with the existing literature and the same as the hypotheses of the original study by Piff et al. (2012). We expected that (1) participants assigned to the greed prime condition would exhibit more unethical behavior compared to those assigned to the neutral prime condition, and (2) participants assigned to the high SES condition would exhibit higher levels of unethical behavior compared to those in the lower SES condition.

Method

Participants

Participants were recruited on the platform of MTurk. Each participant was compensated 50 cents as their show-up fees. The targeted population was English-speaking participants who were U.S.residents and had a MTurk approval rating of 95%. Participants would complete an online Qualtrics survey via MTurk. The study would only continue if the consents from participants were obtained at the beginning of the survey.

Participants were excluded from the analytic sample if they did not answer questions that were necessary for the main data analysis, including the priming tasks and the dice roll reports. We also excluded responses of participants who failed the attention check.

Measures

This experiment was a 2x2 study. The two independent variables were SES and Greed primes. Both of the variables were categorical. The dependent variable was the matching rate, which was obtained from the dice game adapted from Dimant et al. (2020).

The Greed Priming Task. This task was adopted from the original study by Piff et al. (2012) and the replication study from Balakrishnan et al. (2017). Participants were randomly

assigned to the greed prime condition or the neutral prime condition. In the greed-prime condition, participants were asked to think about and write down three ways in which acting greedily was good. In the neutral-prime condition, participants were asked to think about what they did on an average day. In both conditions, the participants saw three text boxes, which asked them to write out their answers with regards to the questions. Please go to Appendix I for the exact messages used in this task.

The Greed Manipulation Check. This task was adopted from the original study by Piff et al. (2012) and the replication study by Balakrishnan et al. (2017). On Likert scales from 1 (*strongly disagree*) to 7 (*strong agree*), participants were asked to evaluate their levels of agreement with five statements that claimed greed was good or beneficial. We obtained a Cronbach's alpha of 0.923 for the manipulation check questions. The total score for each individual was the sum of the five scores.

The SES Priming Task. This task was adopted from Dubois et al. (2015). Participants were randomly assigned to either the high or low SES condition. In both conditions, participants were shown a 10-rung ladder, and asked to conduct a short reflection task. Participants in the high-SES condition were primed with a high-manipulated SES. They were asked to compare themselves to people at the very bottom of the ladder and write three bullet points about how they were different from these people. Participants in the low-manipulated SES condition were primed with a low manipulated SES. They were asked to compare themselves with people at the top of the ladder and write three bullet points about how they were different from these people. Please go to Appendix I for the exact messages used in this task.

The SES Manipulation Check. This task was adopted from Dubois et al. (2015). On a Likert scale from 1 to 10, participants were asked to evaluate their positions on the ladder, which represented the levels of SES. 1 is the bottom rung of the ladder, and 10 is the top rung.

The Dice Game. This task was adopted from Dimant et al. (2020). In each round, participants first thought of a number from 1 to 6. Then they rolled a die virtually and reported if the number they thought of was the same as the number that they rolled. If they reported that the numbers matched, 2 points were added to their scores. The game continued for 6 rounds, so in total 12 points could be earned. The participants were told that their final points would be ranked and compared to other participants of the study. This sense of competition and social comparison could give participants the incentive to win higher scores (Garcia et al., 2013). At the end of the game, all participants were told that they were at the top 25% percentile to control for the variable of final ranking.

The key measurement of the game was the participant's *matching rate*, which was the mean probability in which the participants reported that they correctly guessed the dice roll number across the six attempts. Lying about having the two numbers match while they did not was considered as an unethical behavior. We measured lying by comparing the matching rate to the expected probability of rolling a die (1/6). If the matching rate was statistically higher than 1/6, then the participant lied.

The participants were asked to play 6 rounds because in our pilot study, all participants reported in an honest way, and no one utilized deception. We theorized that this was because participants had not played enough rounds to realize that being dishonest was an option. So in the current study, we increased the number of rounds to 6 so that participants had more opportunities to conduct unethical behavior. Furthermore, having more rounds can also increase statistical power.

The Attention Check. Participants were asked about what they wrote at the beginning of the survey and were given five choices to choose from. Participants who were assigned to the greed prime condition should choose the answer "greed is good." Participants assigned to the neutral prime condition should choose the answer "my day." Participants who chose the other three answers, "greed is bad," "the environment," and "politics," were considered as failing the attention check and were excluded from data analysis.

Two other questions, "Have you previously completed this or a similar survey?" and "What do you think the hypothesis/purpose of this study is?", were also included. Same as the replication study by Balakrisnan et al. (2017), these questions were used for data quality checks and did not serve as exclusion criterias.

Demographics Questionnaire. The demographic questions used in all 4 replications in Balakrishnan et al. (2017) were included. Participants were asked to enter their age, job, annual income, their parents' jobs and incomes and select their gender, ethnicity, and their parents' levels of education based on available options. On a Likert scale from 1 to 7, participants rated on their political orientation (1 = extremely liberal, 7 = extremely conservative) and religiosity (1 = not at all, 7 = deeply religious). In addition, participants were shown a ladder to indicate their real subjective SES conditions from 1 (bottom rung) to 10 (top rung). Participants were informed that their answers to the questions on their jobs, annual incomes, and their parents' jobs, incomes, and level of education were voluntary and would remain strictly anonymous.

Procedure

Consent. Participants were verified that they were not a bot, and that they consented to participate in the study. Participants showed their consent by choosing to continue to the next page of the survey. In the Informed Consent Form, participants were told the process that they would go through and the anonymity of their answers. Then, participants were told that the risk of taking this survey was minimal and provided with information for further contact.

Main process. Participants were first randomly assigned to either the greed-prime condition or the neutral-prime condition to complete the Greed Priming Task. Participants then completed the Greed Manipulation Check, so researchers could ensure that participants' attitudes toward greed was successfully manipulated. Then, participants were randomly assigned to either the high-SES condition or the low-SES condition, followed with the SES Manipulation Check. Then, participants all proceeded to the Dice Game that measured actual unethical behavior. Lastly, participants completed the attention check, the demographics questionnaire and received the debrief form. The process is visually described in *Figure 1*.

Tested Variables. This experiment was a 2 by 2 study. The independent variables were participants' manipulated SES (measured in the SES Priming Task) and their primed attitudes toward greed (measured in the Greed Priming Task). The independent variables were categorical. The dependent variable was the matching rate (measured in the Dice Game). The dependent variable was continuous, as it was the average of six matching scores.

Treatments. RCT was used to sort participants into the different treatments conditions. The randomization process was completed by Qualtrics. Thus, neither researchers nor participants could control how the conditions were randomized.

As shown in *Figure 2*, there were four between-subject conditions. In Treatment 1, participants were assigned to the greed-prime condition and then the low-SES condition. In Treatment 2, participants were assigned to the greed-prime condition and then the high-SES condition. In Treatment 3, participants were assigned to the neutral-prime condition and then the low-SES condition. In Treatment 4, participants were assigned to the neutral-prime condition and then the high-SES condition. All participants then completed the Dice Game and the demographics questionnaire.

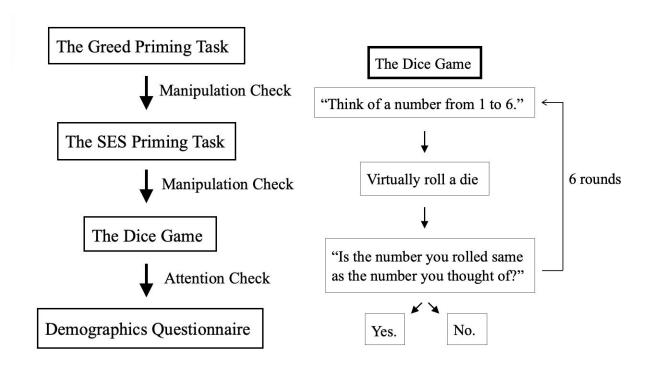


Figure 1: The experimental Procedure shown as a flow chart.

Compared with the original study. As mentioned in the introduction, the experimental design of the current study was different from the original study in two ways. Firstly, the original study established manipulated SES based on participants' real income levels. In the current study, we assigned participants with high or low SES to avoid this ambiguity. Secondly, in the original paper, the measurement of unethical behavior was in the form of a questionnaire. In the

current study, we asked participants to play an actual decision game. As participants could behave unethically, this study had more practical implications.

Analytic Plan

Sample size estimation. The prior power analysis by G-Power indicated that we need 534 participants to capture an effect size of 0.211 reaching an 80% power for the SES manipulation. However, due to the budget and time limit, we stopped collecting data when the sample size reached 234 people. In the post-hoc power analysis, the power was 0.72 for the greed manipulations (*Figure 9*) and 0.06 for the SES manipulation (*Figure 10*).

Main analysis. We used the non-parametric two-tailed Wilcoxon rank-sum test to examine the statistical mean differences. The test was used because we cannot assume normality in our data. We treated the average behavior across the six rounds of the game as one independent observation. As the values obtained from each participant were either "yes" or "no" for each of the 6 trials a participant completes, the data was transformed into the average probability a participant answers "yes," which was a number between 0 and 1. This number was the matching rate. For our main effect analysis, we compared means between the greed prime and neutral prime conditions as well as between the high and low SES conditions. We also compared the matching rate with the baseline probability of rolling a die. The behavior was considered unethical if the matching rate was higher than the expected value of rolling one number out of six numbers on a fair die.

Robustness Check. We ran an OLS regression to check the robustness of our findings¹. Control variables included age, gender, ethnicity, reported subjective SES as interval data, political orientation, religiosity, and log of income. Same as the main analysis, the main estimates that we looked at were prime conditions and manipulated SES conditions. The dependent variable was the matching rate, which is the mean of the six reported match scores for each individual.

Analytical tool. The analysis tool we used was R. The packages included *tidyverse*, *janitor*, *reshape2*, *svglite*, *sciplot*, *rstatix*, *ggpubr*, *coin*, *car*, and *ltm*.

Results

Descriptive Statistics

Analytic sample. The study recruited 234 participants in total. 42 participants failed the attention check, leaving the final sample size of 192 participants for data analysis. No outlier was identified or excluded. The post-attention-check sample size of each condition is shown in *Figure 2*.

¹ In our pre-analysis we registered for an ANOVA but instead we performed an OLS regression which would yield the same p-values.

Demographics information. All participants were living in the US. The median age was 38 and the mean age was 41. There were 95 females, 95 males, 1 non-binary, and 1 preferred not to answer. 151 of the 192 participants were European/European Americans².

Manipulations. Both manipulations were successful. Results of the two manipulation checks demonstrated that participants in the greed prime condition perceived greed more positively than those in the neutral prime condition (W = 2831, p = .000), and that participants in the high SES condition reported to be at a higher SES condition than participants in the low SES condition (W = 6027.5, p = .000). The means and standard deviations of the matching rate in four conditions are shown in *Table 1*.

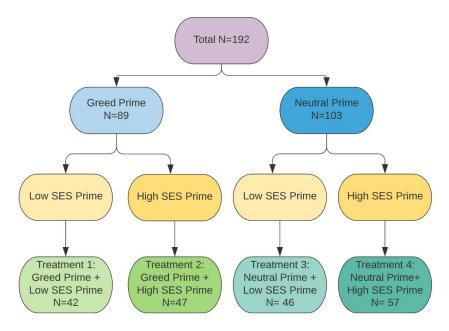


Figure 2: Construction of the analytic sample size shown as a flowchart.

		Greed Prime	Neutral Prime	High SES	Low SES
Matching rate	М	0.442	0.338	0.392	0.379
	s.d.	0.293	0.257	0.279	0.280

Table 1. Matching Rate Per Condition.

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² The demographic breakdown of the remaining 41 participants is as follows: 15 East Asian/Asian Americans, 8 Native Americans, 3 Latinos, 2 European/European American and Latino, 2 Black, 1 Black and Latino, 1 Black, Latino, and Native American, 1 European/European American and Black, and 1 European/European American and East Asian/Asian American, 5 Other, and 2 Preferred Not to Say.

The Dice Game Results

Matching rate between conditions. The matching rate of participants in the greed prime condition was significantly higher than that of participants in the neutral prime condition (W = 3657, p = .014), indicating that participants who favored greed chose to conduct more unethical behavior. This finding was consistent with our second hypothesis. There was no significant difference found in the matching rate between participants in the high SES condition and the low SES condition (W = 4733.5, p = 0.677). In other words, having a higher SES did not make participants conduct more unethical behavior. This finding failed to support our first hypothesis. The findings are visually presented in *Figure 5* and *Figure 6*.

Matching rate and baseline. Participants in all treatments cheated. The average matching rate of participants in all conditions were significantly higher than the baseline, i.e. the expected value of % (p = .000 in all conditions). The change of participants' decisions over rounds in each condition is shown in *Figure 3* and *Figure 4*.

Linear regression results. The results of the linear regression are shown in *Table 2*. After controlling for age, gender, reported SES, political orientation, religiosity, and the log of income, no statistically significant result was found across any treatment groups³. This finding was in line with the null results of the replication study. The significant result of greed did not hold after adding the control variables (b = -.015, s.e. = .104, p = .882), indicating that the control variables were potential contributors of the dependent variable, i.e. the matching rates. The matching rates of people in the high SES condition were not statistically different from that of people in the low SES condition (b = .000, s.e. = .097, p = .998). Political tendency and religiosity were found marginally significant, yet their effect sizes were small. An increase of 1 unit of political tendency from liberal to conservative can lead to a 5.31% increase in the matching rate (b = .053, s.e. = .031, p = .092). An increase of 1 unit of being religious can lead to a 5.33% increase in the matching rate (b = .053, s.e. = .028, p = .066). No variable has a VIF value larger than 3, indicating that there was no multicollinearity among the variables.

We also ran tests that were not included in the pre-registered analytic plan. Considering that time dynamics may play a role in people's decisions in the game over rounds, we ran a panel regression to take the repeated six rounds into account. Please see Appendix II for detailed information. To compare with the original and the replication studies, we also ran linear regression on participants' reported SES instead of their manipulated SES. Please see Appendix III for detailed information.

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³ We included the log of income instead of the absolute numbers to account for income's wide distribution.

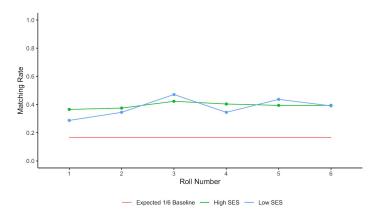


Figure 3: Match scores over rounds in SES conditions compared with each other and the expected baseline.

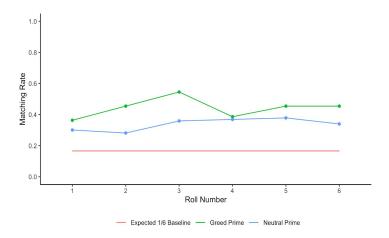


Figure 4: Match scores over rounds in Greed conditions compared with each other and the expected baseline.

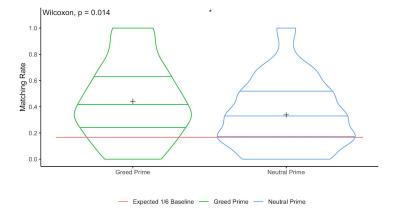


Figure 5: Matching rate between Greed conditions displayed in a violin plot.

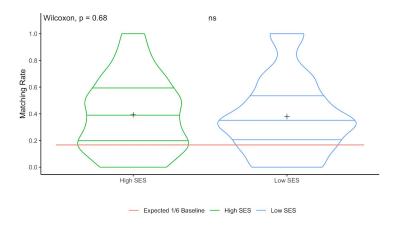


Figure 6: Matching rate between SES conditions displayed in a violin plot.

	Dependent variable:	
	matching rate	vif
Greed prime	015 (.104)	2.198
High SES	.000 (.097)	1.930
Age	.001 (.003)	1.131
Male	.068 (.076)	1.172
Reported subjective SES	.005 (.029)	1.478
Politic Orientation	.053* (.031)	1.525
Religiosity	.053* (.028)	1.354
Log (Income)	129 (.107)	1.480
Greed prime * High SES	.079 (.143)	2.774
Multiple R ²	0.236	
Adjusted R ²	0.118	
Residual Std. Error	0.287 (df = 58)	
F Statistic	1.992* (df = 9; 58)	

Table 2. Linear Regression Results.

^{1. *}p<.01
2. The dependent variable is the average matching rate of participants' report on whether the numbers match over 6 rounds. It is a continuous variable (0 = not match, 1 = match). Controls are: Gender, Age, Reported Subjective SES, Political Orientation, Religiosity, and Log(Income).

^{3.} The small VIFs indicated that there was no multicollinearity in the regression.

Discussion

Our experimental results supported neither of our two hypotheses. Attitude towards greed was no longer a significant predictor of unethical behavior when demographic variables were controlled for in the regression. SES was not a significant predictor in either the Wilcoxon rank-sum test or the linear regression.

In our regression analyses, we found political orientation and religiosity to be marginally significant. Participants who were more conservative or more religious were more likely to behave unethically. This finding is in line with past literature. Religiosity is positively associated with authoritarianism, a trait characterized by respect to authority, unquestioned obedience, and justification of oppression of subordinate people (Durie & Van Hiel., 2012). People high on authoritarianism have higher levels of cognitive dissonance, making people more likely to justify their oppressive behavior towards others (Milgram, 1963). People holding more conservative ideologies tend to be higher on social dominance orientation and thus more supportive of unethical decisions made by others (Leanne et al., 2007). Therefore, it is possible that more conservative and religious people are more capable of conducting mental justification for their unethical behavior. However, it is also important to note that there are many other possible determinants of unethical behavior, such as locus of control, nationality, and Machiavellianism (Hegarty & Sims, 1978). By controlling for more variables, the influence of any one variable on frequencies of unethical behavior is reduced. This may explain why once we controlled for political orientation and religiosity, attitudes towards greed no longer significantly predicted frequencies of unethical behavior.

Our paper's second finding was that manipulated SES did not significantly alter the frequency of unethical behavior, although participants were successfully manipulated to high or low SES conditions. We listed a few potential reasons why no significant result was found. Firstly, SES may not be a predictor of actual unethical behavior. Past research on unethical behavior and SES mostly measured intentions to behave unethically or used hypothetical scenarios as proxies of actually behaving unethically. However, there could be inconsistencies between attitudes and intentions and actual behavior (Piff et al., 2014; Fazio & Zanna, 1981). It is possible that people with high SES have higher intentions or more positive attitudes towards performing unethical behavior, but SES does not affect actual unethical behavior. Secondly, the SES manipulation in our study achieved only 6% of power (*Figure 10*). Being significantly underpowered, our chance of detecting such a relationship is slim even if SES was significantly related to unethical behavior. Thus, it is also possible that the current non-significant result reflects our design's lack of power.

Thirdly, age could be a contributor to people's decisions to cheat. Our sample had a higher mean age than the sample recruited in Dubois et al. (2015), the paper in which we adopted our SES manipulation method from. Participants' mean age in Dubois et al. (2015) was 21 years old. Our sample had a mean age of 41 and a median age of 38. Compared to college-aged students, middle-aged adults are more developed in their self-identity and decision-making processes (Helson et al., 2002). Young people who just enter society are still developing their

self identities and decision-making processes. In contrast, older people have formed a relatively stable pattern of behavior. Their behavioral expectations for different levels of SES can be largely based on stereotypes, and their decisions can be a reflection of those stereotypes rather than a reflection of their self-identity and decision making processes (Koenig et al., 2014). Therefore, despite a successful manipulation in our study, participants' subjective SES may have little impact on their decisions to engage in unethical behavior, leading to fewer cheating behaviors and no significant result in our study. However, due to the small sample size of our study, we were not able to conduct statistically powerful subsample tests to demonstrate how strong the effect of age on unethical behavior was.

Here are the main limitations of this study. Firstly, our experiment was significantly underpowered due to insufficient budget. According to our prior power analysis, we need at least 534 participants to detect an effect. With the final sample size of 191 participants, our post-hoc power analysis indicated that the power of our greed manipulation was 72% (*Figure 9*), and the power of our SES manipulation was 6% (*Figure 10*). Neither of the manipulations reached 85%, the level of power that was conventionally considered as strong.

Secondly, the stable and stereotypical behavioral pattern of middle-aged participants may reduce the effect size of our results. Age was found to be a determining factor in making ethical decisions, and it is negatively correlated with unethical behavior (Ruegger & King, 1992; Van Kenhove, De Wulf, & Steenhaut, 2003). Specifically, people above 40 years old were found to be the most ethical age group, followed in order by the 31–40 group, and the 22–30 group and those of 21 years of age and under were the least ethical (Ruegger & King, 1992). Our sample's mean age of 41 and median age of 38 are along the border where our participants' propensity of making unethical decisions could be significantly reduced. Therefore, even if SES and greed manipulations were effective, participants at a higher age range still might not choose to cheat.

The key implication arising from this study is the need to identify the critical yet often overlooked gap between people's attitude towards unethical behavior and the actual unethical behavior conducted. Past studies found positive correlations between participants' SES and their intentions of committing unethical behavior (Dubois et al.,2015; Liu, 2019; Krekels, 2015; Poluektova, Efremova, & Breugelmans, 2015). However, this positive correlation cannot be extended to the correlation between SES and conducting actual unethical behavior. Furthermore, many studies, like our study, measured actual unethical behavior using games, which had no serious consequences and cannot reflect the complexity of real-life situations. Findings based on hypothetical games should be cautiously applied to conclude real-life unethical behavior, such as Ponzi schemes and tax frauds. Future researchers could focus on examining the effect of SES and greed on specific types of unethical behavior instead of attempting to draw a broad conclusion.

Intrigued by the non-definitive relations between SES, greed, and unethical behavior, the current paper was based on the Piff et al, (2012) paper but changed to measure actual unethical behavior in a decision-making game. Instead of only measuring the self-reported tendency of conducting unethical behavior, this change allowed researchers to aim for a measurement of

unethical behavior that can be more confidently applied to real-life situations. We found that neither greed nor SES were significant predictors of unethical behavior, which confirmed with the previous results of the replication study (Balakrishnan et al., 2017).

Reflection

For the study we conducted, we were able to achieve 72% statistical power testing for the greed manipulation, and 6% for the SES manipulation. The statistical power was adequate given the limitations in funds. We would like to thank Prof. Dimant for supporting us with additional funds.

Here are aspects where we did well: (1) we achieved the replication with behavior as we intended, (2) changed the dice game quickly, and (3) did 2 pre-tests despite the time pressure. Although measuring actual behavior was harder than simply giving a questionnaire, we were glad to design and execute an experiment that included an objective measure component. We were also able to quickly change the dice game design to account for feedback from our first pre-test, which generated an effect size of zero. We changed the design in the second pre-test and successfully produced some results.

We also faced some notable challenges in the process. The adding of the SES manipulation and the game challenged us in researching and finding the most effective methods. During the first pre-test, participants were not finishing the survey. We theorized that this was because participants had a high cognitive burden to write a short paragraph at the beginning of the survey. We ended up adapting the SES manipulation so participants only need to write a couple of words instead of a whole paragraph. We succeeded in gaining more data points. However, by doing so, the effectiveness of this manipulation could be reduced, as participants spent less time reflecting on the task.

The biggest problem with the experimental design we encountered was choosing a game that would allow us to measure unethical behavior given the limited budget and time. The first game we used, the Joker Game, was complicated to code and time-consuming for participants to complete. We thus switched to a dice game by Dimant et al. (2020). In this game, participants would be shown a random roll of a dice and told to report the number they saw. However, in the first pre-test, everyone was perfectly honest reporting every number shown on every roll. We theorized that this happened because (1) the sample we used for the pretest were our families and friends, so they wanted to be helpful by doing what the instructions stated; and (2) the participants did not want to cheat and appear bad because they believed that we could track the number they rolled (despite the instructions stating that it would be a random roll). The game was shorter, and it gave participants room of privacy, since researchers cannot track the numbers that participants thought of in their minds.

Another challenge we faced was deciding the number of rounds we wanted to do for the dice game. In the first iteration of the dice game, we asked participants to do 3 rounds of the game, and nobody cheated. When we switched over to the final version, we changed it to 6 rounds to give participants more chances to cheat. Additionally, at that time, we wanted to gain

more data points per person as we knew we were limited to a certain number of participants due to the budget constraint. In the in-class presentation, another group had a game that also measured unethical behavior and was very brief. In their game, each participant would only take approximately 3 minutes to complete the whole experiment. We considered learning from them and changing the game to just 1 round. However, we ultimately decided against it as we believed having multiple rounds per person can reduce the statistical noise. Retrospectively, we realized that the statistical noise was not reduced much by having more rounds.

Something we would have done instead was to ask each participant to only play 1 round of the dice game instead of 6. Though our statistical power was adequate at 72%, it could have been even higher if we had reduced the number of rounds in the game and instead recruited more participants. The data we collected was suitable for a panel regression, but it did not fit into our hypotheses as well.

During the whole process, we learned to examine more closely on the compatibility of data and the accuracy of measuring what we wanted to measure. We also learned the importance of pre-tests. If we had not done a pre-test, we might have gotten 0 effect size for our final results, which would have been a waste of everyone's time. Though we did not produce significant results after controlling for demographic variables, we learned that manipulations based on prior research may not work as intended when circumstances changed.

Overall, we were able to test our hypotheses and reproduce the replication (Balakrishnan et al., 2017), albeit with less power. We learned many things from conducting this experiment from start to finish. Even robust methods utilized by prior studies may not produce expected results in similar designs. Having a clear, concise, and well-informed research question based on previous literature is also a crucial step in the research process. Finally, even small changes in the experimental design can have huge impacts on the final outcome. So we should be extremely intentional when implementing any changes and when choosing designs that best fit our research question.

Conclusion

We found attitudes toward greed to be significant from the results of the Wilcoxon rank sum test, but when demographic variables were controlled for in the regression, that effect disappeared. SES was not a significant predictor in any of our statistical analyses. Though our data did not support our hypotheses, we did find two interesting results that challenge popular conceptions. More positive attitudes towards greed and being high on SES did not significantly increase frequencies of unethical behavior. Participants assigned to the greed prime condition did not exhibit more unethical behaviors compared to those assigned to the neutral prime condition, and participants assigned to the high SES condition did not exhibit higher levels of unethical behaviors compared to those in the lower SES condition. The mean difference between the greed and neutral prime conditions became non-significant when political orientation and religiosity were controlled for. Limitations in our study include a lack of statistical power and reduced effect sizes. Our experiment highlights the complexity of unethical behavior. There are many

determinants as to why people behave unethically. Although greed and SES were commonly believed to cause people to behave unethically, our results did not support such notions and revealed that causes of unethical behavior could be much more nuanced. Furthermore, our study has also shown that factors that influence intentions to act unethically may not necessarily cause people to actually act unethically. A lot more work must be done before we can have a more comprehensive understanding of what leads to unethical behavior. Directions for future research can investigate whether age, political orientation, religiosity has any relationship with regards to frequencies of unethical behavior.

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Appendix I

The Greed Priming Task Message

In the greed-prime condition, the message shown to the participants is as follows:

"Please take a few minutes to think of ways in which acting greedily and pursuing your self-interest can be good. For example, being greedy, or prioritizing self-interest, may allow you to be successful and achieve your professional goals. Please think of three additional ways in which greed can be good and write them in the boxes below."

In the neutral-prime condition, greed was not mentioned. The participants were shown the message below:

'Please take a few minutes to think of the things you do on an average day. For example, one might go to work or spend time at the gym. Please think of three things that you do on an average day and write them in the boxes below.'

The SES Priming Task Message

High SES

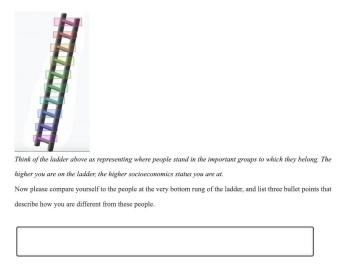


Figure 7: a screenshot of our low SES prime message and the visual of the ladder accompanying it

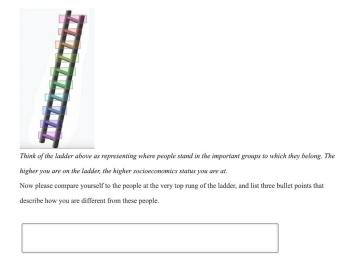


Figure 8: a screenshot of our low SES prime message and the visual of the ladder accompanying it

Appendix II

Instead of using the matching rate, in the panel regression, we kept the six matching scores to correspond to participants' decisions to cheat or not over the six rounds. Thus, the dependent variable of the regression, the matching score, was not numerical but categorical (1 = yes, 0 = no). The independent variables and the control variables were the same as the linear regression we ran.

Results showed that participants in the greed prime condition did not cheat significantly more than participants in the neutral prime condition (b = -.015, s.e. = .104, p = .881), and that participants in the high SES condition did not cheat significantly more than participants in the low SES condition (b = .000, s.e. = .097, p = .998). The results supported neither of the two hypotheses. The coefficients, standard errors, p-values and other test statistics of all variables are shown in Table 3.

	Dependent variable:	
	match score	
Greed prime	015 (.104)	
High SES	.000 (.097)	
Age	.001 (.003)	
Male	.068 (.076)	
Reported subjective SES	.005 (.029)	
Politic Orientation	.053* (.031)	
Religiosity	.053* (.028)	
Log (Income)	129 (.107)	
Greed prime * High SES	.079 (.143)	
Roll 2	.103 (.072)	
Roll 3	.191*** (.072)	
Roll 4	.103 (.072)	
Roll 5	.103 (.072)	
Roll 6	.088 (.072)	
R ²	0.060	
Adjusted R ²	0.026	
Residual Sum of Squares	70.089	
Total Sum of Squares	74.541	
Chi-Square	24.961** (df = 14)	

Table 3. Panel Regression Results.

1. *p<.01, **p<.05, ***p<.001

2. The dependent variable is the matching rate over 6 rounds. It is a categorical variable (0 = not match, 1 = match). Controls are: Gender, Age, Reported Subjective SES, Political Orientation, Religiosity, and Log(Income).

Appendix III

In this regression, we replicated the linear regression conducted in the original study (Piff et al., 2012). Instead of using manipulated SES as one of the main independent variables, we used reported SES that was based on participants' real-life situations. The dependent variable was the matching rate over 6 rounds. Again, we did not find anything significant. The null finding indicated that having a higher SES in real life was not a predictor of conducting unethical behavior (b = .010, s.e. = .037, p = .780), and that thinking "greed is good" did not lead to behaving more unethically (b = .053, s.e. = .295, p = .857). The coefficients, standard errors, p-values and other test statistics of all variables are shown in Table 4.

	Dependent variable:
 	matching rate
Greed prime	053 (.295)
Reported subjective SES	.010 (.037)
Age	.001 (.003)
Male	.075 (.075)
Politic Orientation	.054* (.031)
Religiosity	.053* (.028)
Log (Income)	147 (.102)
Greed prime * Reported subjective SES	006 (.047)
Multiple R ²	0.229
Adjusted R ²	0.145
Residual Standard Error	.286 (df = 59)
F Statistic	2.195** (df = 8; 59)

Table 4. Replicated Linear Regression Results.

^{1. *}p<.01, **p<.05, ***p<.001

^{2.} The dependent variable is the average matching rate of 6 rounds. It is a continuous variable (0 = not match, 1 = match). The main independent variables are Greed Prime and Reported Subjective SES. Controls are: Gender, Age, Reported Subjective SES, Political Orientation, Religiosity, and Log(Income).

Appendix IV

Figure 9 and Figure 10 are the results of the post-hoc power calculations. These calculations were based on the Wilcoxon rank-sum test to compare between greed prime and neutral prime conditions, and high and low SES conditions. The calculations were conducted in GPower 3.1.9.4. Our study achieved a statistical power of 0.72 for the Greed conditions and 0.06 for the SES conditions.

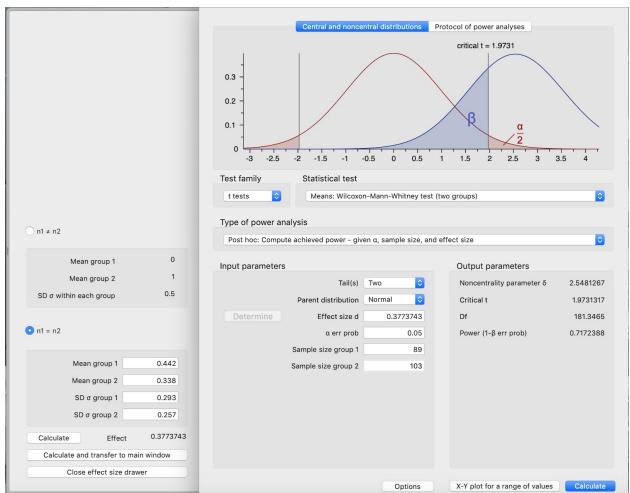


Figure 9: Ad hoc power calculation conducted in GPower version 3.1.9.4. The screenshot shows the calculation of our effect size and power for the differences between Greed Prime condition and Neutral Prime Condition based on our Wilcoxon rank sum test results.

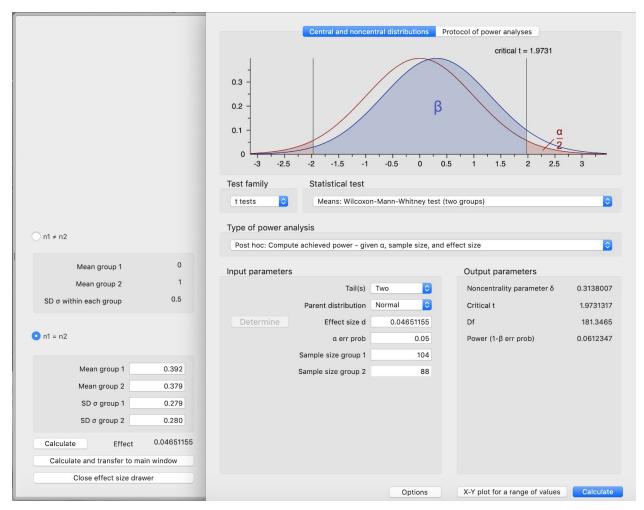


Figure 10: Ad hoc power calculation conducted in GPower version 3.1.9.4. The screenshot shows the calculation of our effect size and power for the differences between the high SES condition and low SES condition based on our Wilcoxon rank sum test results.

Figure 12 shows the results of the a priori power calculations, based on our pre-test test results for the differences between high and low SES conditions. The calculation was conducted in GPower 3.1.9.4. In order to achieve a power of 0.8, we would have to collect 291 participants per condition.

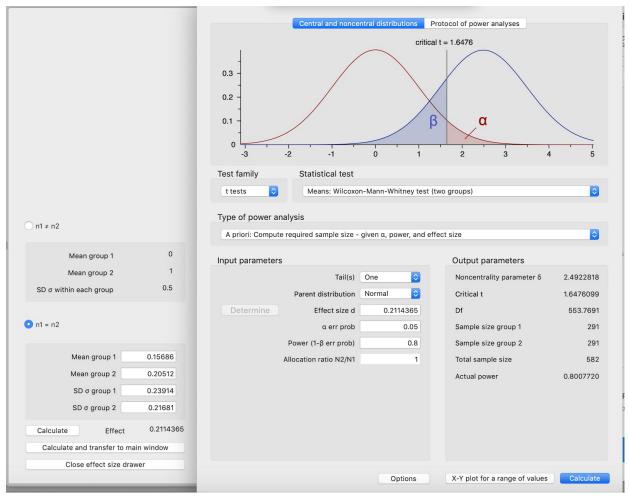


Figure 12: A priori power calculation conducted in GPower version 3.1.9.4. The screenshot shows the calculation of our effect size and power for the differences between the high SES condition and low SES condition.

Group Level Assessment

Who made the best contributions to the group project (receives +2% on the group's grade)?

- Student Name (can remain blank if does not apply): Bingling
- Explain in detail how exactly (if applies): Bingling consistently produced excellent work, was not late with any of our deadlines, and helped manage the project.

Who contributed the least to the group project (receives -2% on the group's grade)?

•	Student Name (can remain blank if does not apply):
•	Explain in detail how exactly (if applies):

Things that worked particularly well in the group:

We broke up every assignment into smaller steps to make them more approachable. We had a clear division of labor which held each of us accountable. We were flexible with everyone's hours and managed to meet across multiple time zones.

Things that could have worked better in the group:

For a period of time in the middle of the semester we weren't all very responsive on Slack. A better way to approach this would have been to communicate from the very start that Slack would be our primary way of communication, and it is an expectation that all of us should be checking it.