# Proposed Study 3

**Method**

Study 3 will analyze the interaction between moral conviction and social consensus using a within-subjects design. Participants will be randomly assigned to either the low or high social consensus manipulation condition, then, they will be randomly assigned to either the low or high moral conviction manipulation condition. This results in a 2x2 design, where participants will be in 1 of 4 experimental conditions (low consensus/low conviction, low consensus/high conviction, high consensus/low conviction, high consensus/high conviction). The primary outcome, attitude towards the highly polarized issues, is measured both before and after experimental manipulation. The Institutional Review Board at the University of Missouri will review and approve all submitted materials for Study 3 before research begins.

***Participants***

A total of 505 undergraduate students 18 years of age or older at the University of Missouri participated in this study. Participants were recruited through an online survey platform and were offered psychology course credit in exchange for their participation. Participants were asked to select categories that best described their race/ethnicity. Participants self-identified as: White (77%), Black (5.3%), Hispanic (6.7%), Asian (5.1%), Native American (0.39%), ‘other’ (2.4%), or ‘prefer not to say’ (1.8%). Participants also self-selected their preferred gender identity; 63.6% participants identified as ‘Female’, 33.5% ‘Male’, 1.4% ‘Gender Variant or Nonconforming’, and 1.6% ‘prefer not to say’. They ranged in age from 18 to 39 years (*M* = 18.9, *SD* = 1.99).

***Materials and Procedure***

For each of the four highly polarized issues (Climate Change, Universal Health Care, Death Penalty, and Slavery), participants were first asked to estimate the proportion of the US population in 2018 that would be in support of the issues. Then, participants were given information about social consensus on each of these four issues. To manipulate the perception of social consensus, participants were randomized into a ‘high social consensus’ or ‘low social consensus’ condition. In both conditions, participants were given feedback consisting of the base rate of support that the general American public (in 2018) had for the four highly polarized issues. Participants in the ‘high social consensus’ condition saw results that were 20% higher than the true base rate. Participants in our ‘low social consensus’ condition saw results that were 20% lower than the true base rate. For example, if 65% of Americans agree that the Death Penalty is necessary in the US, the high social consensus condition would be told that 85% agree, and the low social consensus condition would be told that 45% agree.

After the social consensus information, participants are asked to indicate their degree of surprise at the stated level of public support and estimate levels of public levels support in 2023. Participants are then asked to identify their level of support for each of each of the four highly polarized issues. Finally, participants completed several individual difference measures and provided demographic information.

***Measures***

**Primary Outcome.** Participant support for the highly polarized issues was captured as continuous variable ranging from strong disagreement (0) to strong agreement (100) with the following statements: 1) “Greenhouse gas emissions generated by human activity has and will continue to change Earth's climate” (*Climate Change*); 2) “The US government needs to implement Universal Health Care because basic population needs are not being met.” (*Universal Healthcare*); 3) “Capital Punishment (the Death Penalty) is necessary in the US” (*Death Penalty*), and 4) “Slavery, forced labor, and human trafficking are violations of human rights.” (*Slavery*).

Secondary Outcomes. Estimates of public support for the four highly polarized issues were obtained by asking participants to estimate what percentage of the American public would agree with the above statements. Participants provided a number ranging from 0-100%. Separate estimates were obtained for 2018 and 2023. Participants were also asked to rate how ‘surprised’ they were at the 2018 social consensus information provided. Surprise was measured with a 5-point Likert scale ranging from ‘Not Surprised’ (1) to ‘Very Surprised’ (5).

Individual differences in deontological and utilitarian orientation were measured using the Ethical Standards of Judgement Questionnaire (ESJQ) developed by Love, Salinas, and Rotman (2020). Six items measure deontological orientation (e.g., “Solutions to ethical problems are usually black and white”), and six items measure utilitarian orientation (e.g., “When people disagree over ethical matters, I strive for workable compromises”). Participant agreement with these statements was measured with 5-point Likert scales ranging from ‘Strongly Disagree’ (1) to ‘Strongly Agree’ (5). Each six-item subscale showed satisfactory internal consistencies with Cronbach’s α of .783 (deontology) and .750 (utilitarianism).

Health literacy was measured using the Single Item Health Literacy Screener (SILS) developed by Morris, MacLean, Chew, and Littenberg (2006). Health literacy is measured by self-reported confidence with medical forms (e.g., “How confident are you filling out medical forms by yourself?”) using a 5-point Likert scale ranging from ‘Never’ (1) to ‘Always’ (5). We used two separate measures of numeracy. The Subjective Numeracy Scale (SNS) developed by Zikmund-Fisher, Smith, Ubel, and Fagerlin (2007) contains four items that measure cognitive abilities, e.g., “How good are you at working with fractions”), rated with 5-point Likert scales ranging from ‘Not at all good’ (1) to ‘Extremely good’ (5). An additional four items measure preference for numeric information, e.g., “When reading the newspaper, how helpful do you find tables and graphs that are parts of a story?”), rated with 5-point Likert scales such as ‘Not at all helpful’ (1) to ‘Extremely helpful’ (5). Objective numeracy was measured using a number line estimation task adapted from Sigler, Thompson, and Schneider (2011). This task consisted of placing fractions in the correct place on a number line. Participant placed 10 fractions on a number line that ranged 0-1 (e.g., 1/19, 1/7, 3/8, 11/14), and 10 fractions on a number line that ranged from 0-5 (e.g., 17/4, 9/2) Performance was calculated as the total percent absolute error accumulated across all fractions, defined as: (|Answer - Correct Answer|) / Numerical Range.

***Power and Statistical Analysis***

A minimum sample of 158 participants was needed to achieve 95% power for a linear multiple regression with the following parameters: ANOVA, repeated measures, between factors, an effect size of .25, an alpha of .05, two groups, two measurements, and .5 correlation among repeated measures. Power was determined a-priori using G-power 3.1.9.7 (Faul, Erdfelder, Lang, and Buchner, 2007; Faul, Erdfelder, Buchner, and Lang, 2009). The four highly polarized beliefs that were surveyed were all treated as continuous variables. We examined the effects of experimental condition (high or low social consensus) and individual differences (deontological and utilitarian orientation, health literacy, multiple measures of numeracy) on our outcome measure. We examined the main effect, as well as interactions between deontology and utilitarianism with our experimental conditions for our predictors. All tests were conducted in R and considered statistically significant when P <.05.

***Study 1 Hypotheses***

We predicted high social consensus would lead to more positive support for highly polarized issues (H1). Additionally, our second hypothesis is that the two subscales, Utilitarian and Deontological Orientation, of the ethical standards of judgement questionnaire (ESJQ) would be significant predictors of support for these polarized issues. (e.g., our hypothesis had no *a-priori­* directional effect).

**Results**

We tested our two hypotheses with a series of within-subjects analysis of variance (ANOVA) models comparing support for the highly polarized issues both before and after our social consensus manipulation. The alpha level for these analyses was .05.

***Social Consensus Manipulation***

Each of our four ANOVA models was composed of our dependent variable (quantified as level of support for our issues), with time, condition, numeracy (subjective and objective), utilitarian orientation, deontological orientation, and health literacy as our ‘simple effect’ predictors. To test H1, we conducted a mixed ANOVA with time (pre or post intervention) as a within-subjects factor and our social consensus manipulation (high or low social consensus condition) as a between-subjects factor.

In support of H1, there was a significant time x condition interaction, such that there was greater increase over time in support for the highly polarized issues in the high social consensus condition compared to the low social consensus condition. Our planned analysis revealed that participants in our two social consensus conditions had a statistically significant difference in pattern from pre- to post-intervention (e.g., participants in the high social consensus condition had higher post-intervention scores, and participants in the low social consensus had lower post-intervention scores). This pattern was the case for: 1) Universal Health Care, (ßtime x condition = 7.600, *p* = 0.015), Capital Punishment, (ßtime x condition = 8.238, *p* = *0.025*); and 3) Climate Change, (ßtime x condition = 5.614, *p* = 0.025). The table below briefly summarizes group mean differences between the conditions and times. Additionally, see figure \_\_\_ below, illustrating this pattern of effects from pre- to post- intervention.

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| --- | --- | --- | --- | --- |
|  | | **IV 2: Social Consensus Condition** | | |
| High Social Consensus | Low Social Consensus |
| **IV 1: Time** | Pre-Manipulation | UHC, M(SD) = 68.90 (25.24); Death Penalty, M(SD) = 40.94 (30.14); Climate Change; M(SD) = 76.01 (22.82) | UHC, M(SD) = 67.43 (26.74); Death Penalty, M(SD) = 40.60 (28.91); Climate Change; M(SD) = 77.81 (20.28) |
| Post-Manipulation | UHC, M(SD) = 72.96 (24.30); Death Penalty, M(SD) = 45.40 (32.12); Climate Change; M(SD) = 78.65 (21.45) | UHC, M(SD) = 64.90 (27.18); Death Penalty, M(SD) = 36.84 (28.72); Climate Change; M(SD) = 74.83 (22.93) |

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***Deontological and Utilitarian Orientation***

There was mixed support of H2a. Deontological orientation was a significant predictor of support for Universal Health Care (ß = 3.504, *p* < .05), where greater deontological orientation was associated with greater support for UHC but not for Capital Punishment (ß = 1.28, *p* = *NS*) or Climate Change (ß = 1.03, *p* = *NS*). Furthermore, there was no support for H2b; utilitarian orientation was not a significant predictor of Universal Health Care (ß = -0.470, *p* = *NS*), Capital Punishment (ß = -1.00, *p* = *NS*), or Climate Change (ß = 1.256, *p* = *NS*).

***Exploratory Analyses***

In addition to our planned analyses, we conducted additional exploratory analyses on the effects of the individual differences on our main outcome measure of support for a given highly polarized belief. Individual differences in objective numeracy had no significant effects on support for: 1) Universal Health Care, (ß = -0.103, *p* = *NS*); 2) Capital Punishment, (ß = 0.390, *p* = *NS*); or 3) Climate Change, (ß = 0.335, *p* = *NS*). Additionally, individual difference in subjective numeracy had no significant effects on support for: 1) Universal Health Care, (ß = 0.558, *p* = *NS*); 2) Capital Punishment, (ß = 0.431, *p* = *NS*); or 3) Climate Change, (ß = -0.339, *p* = *NS*). Likewise, individual differences in health literacy had no significant effects on support for: 1) Universal Health Care, (ß = 0.313, *p* = *NS*); 2) Capital Punishment, (ß = -0.620, *p* = *NS*); and 3) Climate Change, (ß = -0.147, *p* = *NS*). These results indicate that individual differences in objective/subjective numeracy and health literacy were not associated with our primary outcomes.

***Discussion***

The results for Study 1 provide evidence of two main points. First, as prior literature on the effect of social conformity suggests, perception of social consensus (whether in support or opposition of a position) results in subjects aligning themselves with that consensus. Second, that greater deontological, but not utilitarian, predisposition, can be associated with changes in support for a topic. To the extent that deontological orientation affected support for a topic, it was associated with support for Universal Health Care. Methodologically speaking, one major area of concern that was not addressed in this study was alternative methods for manipulation of support for a given topic. While manipulation of social consensus was effective, there are real concerns about the ethics of presenting a ‘false consensus’ in the process of informing and shaping public opinion. In practice, several other axis of behavior exist that have potential to be leveraged to change public support for contemporary topics. Many extremely polarizing topics are felt with ‘moral conviction’, thus, it seems to be a plausible direction to manipulate perspective change. Finally, all four of our topics for Study 1 were chosen due to prior literature indicating the topic as highly polarized (climate change, capital punishment, death penalty) or because there is plausible reason to believe ethical concerns would affect the issue (Universal Health Care). However, we have not looked at how manipulations that can lead to perspective change could be different in the context of a ‘non-polarized’ topic. Therefore, we planned to incorporate an intentionally ‘non-polarized’ topic for our next study. With these issues in mind (manipulating a different axis of behavior for perspective change, choosing a non-polarized topic), Study 2 was initiated.