

Death Penalty Beliefs: How Attitudes are Shaped and Revised

By

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## ABSTRACT

Although most Americans support capital punishment, many people have misconceptions about its efficacy and administration (e.g., that capital punishment deters crime). Can correcting people's inaccurate attitudes change their support for the death penalty? If not, are there other strategies that might shift people's attitudes about the death penalty? Some research suggests that statistical information can correct misconceptions about polarizing topics. Yet, statistics might be irrelevant if people support capital punishment for purely retributive reasons, suggesting other argumentative strategies may be more effective. In Study 1, I compared how two different interventions shifted attitudes towards the death penalty. In Studies 2 - 4 I examined what other attitudes shape endorsement of capital punishment, and used these findings to develop and test an educational intervention aimed at providing information about errors in the implementation of the death penalty. Altogether, these findings suggest that attitudes about capital punishment are based on more than just retributive motives, and that correcting misconceptions related to its administration and other relevant factors reduces support for the death penalty.

*Keywords:* capital punishment, coherence-shifts, statistical interventions, open science

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## **Introduction**

In October 2018, Washington state became the 20th state to overturn capital punishment on the grounds that it is unconstitutional, stating that death sentences have been “imposed in an arbitrary and racially biased manner” (Johnson, 2018). Although capital punishment has come under scrutiny at the state-level recently, a current poll indicated that 55% of adults in the United States still favor the death penalty for a person convicted of murder (Jones, 2017). However, many people who support the use of capital punishment have misconceptions about its efficacy and administration. For instance, many people believe that capital punishment is an effective deterrent against violent crime, that innocent people are not sentenced with the death penalty, and that it is administered in a fair and unbiased manner (see Manski & Pepper, 2013; DPIC, 2018; Baldus, Woodworth, Zuckerman, & Weiner, 1998). These widespread misconceptions have prompted groups like the Death Penalty Information Center (DPIC) and the Innocence Project to better educate the public about the facts and some of the problems with capital punishment. Given that people have misinformed attitudes about issues integral to the administration and efficacy of capital punishment, can correcting their misconceptions shift their support for the death penalty, and if not, are there other argumentative tactics that could be used to shift people’s attitudes about the death penalty? Additionally, does shifting people’s support for capital punishment depend on what attitudes or motivations people have for favoring the death penalty? This paper seeks to shed light on these questions.

In the first section of the paper, I discuss what kinds of information are effective at changing people's views towards the death penalty. Specifically, I consider how two types of interventions—*statistical* and *coherence-based* interventions—affect attitude change. In light of the results of this investigation, in the second section of the paper I describe a series of exploratory studies examining the auxiliary beliefs that shape people's death penalty attitudes. Based on these findings, I describe the development of an educational intervention and examine how its efficacy might be moderated by other, more remote beliefs people may have.

### **Section 1:**

#### **Statistical and Coherence-based Interventions**

Ideally, we could affect attitude change by simply providing people with accurate statistical information – on the basis of this information, people may still favor the death penalty, but it would not be based on misconceptions about its efficacy and administration. On the other hand, there is some reason to think that statistical interventions like these may not be effective at changing people's moral attitudes. In a now classic study, Lord, Ross, and Lepper (1979) found that when participants were presented with mixed statistical evidence about capital punishment they became more polarized in their beliefs rather than tempering in their views. People strongly attended to the information that confirmed their position and ignored the information that was inconsistent with their position. These results have suggested to many researchers that simply providing statistics may not prove to be an effective tactic for correcting people's misconceptions (e.g., Thaler & Sunstein, 2008; Janis & King, 1954; Gawronski & Bodenhausen, 2006).

More recently, however, some research suggests that statistical information, especially when carefully presented (e.g., using visual aids) can correct misconceptions about polarizing topics like climate change and anti-vaccine attitudes (see Lewandowsky, Ecker, Seifert, Schwarz, & Cook, 2012; Horne, Powell, Hummel, & Holyoak, 2015). For instance, Cochran and Chamlin (2005) required undergraduate students to participate in a class about capital punishment and found that exposing students to information surrounding the administration of the death penalty was generally associated with more negative attitudes towards capital punishment. Subsequent research has similarly revealed that providing people information about issues surrounding the death penalty can reduce support for capital punishment. For example, people presented with information about wrongful death sentences were less likely to support capital punishment (Lambert, Camp, Clarke, & Jiang, 2011). There is thus preliminary evidence that it is possible to shift people's death penalty beliefs by providing them with factual information. However, it remains unclear how the efficacy of educational interventions interacts with people's auxiliary reasons for supporting the death penalty, including the motivation to punish for retributive reasons.

Altogether, these results may be considered some cause for optimism, but they may not establish exactly what interventions are most effective at changing people's attitudes about the death penalty. For example, statistics might be irrelevant to some people's support of capital punishment. For moral reasons alone, people may support the use of capital punishment because they think criminals should get what they deserve and that it is the morally right thing to do (e.g., Bohm, Clark, & Aveni, 1991; Sarat &



Vidmar, 1976). Consequently, providing statistics about problems with the administration of the death penalty may do little to alter these attitudes about the death penalty.

Current research suggests that even if attitudes about the death penalty are driven entirely by the desire for retribution, it may still be possible to shift their moral attitudes. A recent line of work has examined how moral attitudes change when related attitudes are manipulated (e.g., Horne, Powell, & Hummel, 2015; Holyoak & Powell, 2016). In the law, coherence is an important theoretical virtue (e.g., Dancy, 1984). Moral theories that are incoherent are generally considered “nonstarters” and inconsistencies in influential moral theories are often the topics of entire books (e.g., Lyons, 1965; Gewirth, 1978; Rawls, 1980; Sen & Williams, 1982; MacIntyre, 2007). These considerations do not appear to only be the concern of academics. For example, Horne and colleagues (2015) found that when people are presented with a situation (e.g., a moral dilemma) that elicits a judgment inconsistent with a general moral principle (e.g., utilitarianism), tension arises due to an internal conflict among participants’ attitudes about the dilemma and the general moral principle. This tension induces belief revision because people desire to restore coherence in their network of beliefs (e.g., Festinger, 1957; Holyoak & Powell, 2016).

Altogether, people may support the use of capital punishment for reasons like deterrence and the cost of execution, which may suggest that presenting accurate statistical information could change people’s minds (e.g., Cochran & Chamlin, 2005). On the other hand, the death penalty is a moral issue importantly linked to attitudes about just deserts—this may suggest that interventions aimed at highlighting people’s incoherent

beliefs (henceforth referred to as coherence-based interventions) would be more persuasive than raw statistical information.

In Study 1 we sought to resolve questions concerning the efficacy of statistical interventions and how they compare to other interventions (e.g., coherence-based interventions) which may be more effective at shifting people's uniquely moral attitudes, like those rooted in retribution. Thus, we compared the efficacy of statistics and coherence-based interventions at shifting people's attitudes towards capital punishment.

## Study 1

### Method

We developed statistical and coherence-based interventions aimed at countering three common attitudes people have for supporting the death penalty (e.g., see O'Neil, Patry, & Penrod, 2004). These attitudes were: (1) People who commit serious crimes, such as murder, deserve to be put to death (retribution), (2) The death penalty discourages people from committing crime (deterrence), and (3) The death penalty is cheaper than life-imprisonment (cost).

**Preregistration.** The data collection plan, predictions, and analysis scripts for our study were preregistered through the Open Science Framework. Experimental scripts, analyses, and supplemental materials are available [here](#).

**Participants.** We recruited 504 participants through Amazon Mechanical Turk. Our sample size was predetermined by conducting a power analysis to detect a Cohen's  $d$  of .25 with 80% power. We used an optional stopping procedure by computing a Bayes Factor on the parameter estimating the effect of condition (that is, the parameter of

interest). Specifically, we determined that we would continue data collection until the Bayes Factor ( $BF_{10}$ ) was greater than 100 or less than .01, at which point we would stop data collection (Rouder, 2014). After excluding participants who failed attention checks, 405 participants remained for our final sample (46% female,  $Mdn_{age} = 34$  years old). Each participant was compensated \$0.70 for completing the study.

**Procedure.** Participants were randomly assigned to either the statistical or coherence-based intervention, in which they saw either three statistical arguments or three coherence-based arguments in a between-subjects design.

The study proceeded as follows: Participants first were asked to rate how much they agreed with three pre-intervention statements (one statement for each commonly-held belief about capital punishment: i.e., retribution, deterrence, and cost). Then participants received either the statistical or coherence-based intervention, which consisted of statistical or coherence-based arguments designed to counter attitudes about deterrence, cost, and retribution as motivations for supporting the death penalty. After reading these arguments, participants completed the post-intervention measure which captured participants' attitudes about retribution, deterrence, and cost, and their overall attitudes towards capital punishment. Participants then were asked to provide general demographic information. These measures and interventions are described in more detail below.

**Pre-Intervention Measure.** Participants were asked to rate their agreement with three pre-intervention statements to measure their initial attitudes about the death penalty. Each of these statements measured three common motivations for supporting the death penalty on a 7-point Likert scale (1 = "Strongly disagree", 7 = "Strongly agree"). For

example, the item that measured attitudes about deterrence was, “The death penalty makes criminals think twice before committing murder.” These statements were developed based on our post-intervention capital punishment measure.

**Interventions.** As noted, participants were randomly assigned to either the statistical or coherence-based intervention, in which they read three statistical arguments or three coherence-based arguments against each belief for supporting the death penalty.

The statistical intervention was composed of brief summaries of empirical research taken from the Death Penalty Information Center (DPIC). This research contradicts common attitudes about capital punishment. For instance, the statistical argument for deterrence summarized information about criminology experts’ and researchers’ conclusions regarding the efficacy of capital punishment as a deterrent. Excerpts from this argument stated that “88% of these experts rejected the notion that the death penalty acts as a deterrent to murder”, and that “studies claiming that the death penalty has a deterrent effect on murder rates are fundamentally flawed”.

The coherence-based intervention consisted of brief persuasive arguments adapted from widely-cited law papers. In these papers, authors attempt to persuade readers through coherence-based arguments why the typical reasons taken to support the death penalty are inconsistent with other attitudes they otherwise strongly hold. Therefore, these arguments did not provide information about a belief being inherently false, but rather demonstrated ways in which the reason underlying a belief was incoherent with their other attitudes. For example, the coherence-based argument for cost demonstrated that determining whether someone should live or die based off of financial considerations

is not a practice people generally condone and thus, it should not be considered a good reason either in the case of capital punishment.

**Post-Intervention Measure.** The post-intervention items measured participants' attitudes about retribution, deterrence, and cost, along with their general attitudes towards the death penalty. Participants were asked how much they agreed with 13 statements, adapted from the Death Penalty Attitudes Questionnaire (O'Neil et al., 2004). An example of a *general* death penalty item (general items labeled G1 - G4 in Figure 1) was, "I think the death penalty is necessary." Four of the items tapped into attitudes about retribution (labeled R1 - R4 in Figure 1). For example, one of these items was "Society has a right to get revenge when murder has been committed". Complete materials and measures for each study can be found in the Supplementary Online Materials (SOM) [here](#).

### **Analytic Approach**

We performed Bayesian mixed-effects modeling using the R package brms (Bürkner, 2018). We set regularizing priors for all population-level effects in our models: namely, a normal distribution with a mean of 0 (i.e., no effect) and a standard deviation of 1. These priors are recommended because they provide conservative effect size estimates and reduce the likelihood of overfitting (Gelman, Lee, & Guo, 2015; McElreath, 2016). The analysis scripts for these models are available on the Open Science Framework.

### **Results**

We tested whether statistical or coherence-based arguments would be more effective at changing people's attitudes towards capital punishment. Further, we aimed to

understand how the effectiveness of each intervention varied as a function of the specific attitudes, or reasons people have for supporting capital punishment. In order to test this, we performed Bayesian ordinal mixed-effects modeling, predicting post-intervention attitudes towards the death penalty on the basis of condition (1 = Statistics, 0 = Coherence-based), and participants' pre-intervention attitudes, which we modeled as a monotonic effect. This model treated both participants and scale items as group-level effects, allowing for heterogeneity in the intercept for each participant and question (Judd, Westfall, & Kenny, 2012). The model is specified below in the syntax of brms (Bürkner, 2018; also see Bates, Mächler, Bolker, & Walker, 2015):

```
Response ~ Condition + mo(PreRetribution) + mo(PreDeterrence) +
mo(PreCost) + (1|Question) + (1|Subject)
```

Bayesian analyses formulate model parameters as probability distributions wherein the posterior distribution for a parameter  $\theta$  is computed via the prior and the likelihood of  $\theta$ . To model the joint probability distribution of participants' responses, we specified the following priors over the possible effects each variable could have on our response variable:

$$\beta_{Intercept[1]} \sim t(3,0,10)$$

$$\beta_{Intercept[2]} \sim t(3,0,10)$$

$$\beta_{Intercept[3]} \sim t(3,0,10)$$

$$\beta_{Intercept[4]} \sim t(3,0,10)$$

$$\beta_{Intercept[5]} \sim t(3,0,10)$$

$$\beta_{Intercept[6]} \sim t(3,0,10)$$

$$\beta_{Statistics} \sim N(0,2)$$

$$\beta_{PreRetribution} \sim N(0, 2)$$

$$\beta_{PreDeterrence} \sim N(0, 2)$$

$$\beta_{PreCost} \sim N(0, 2)$$

$$sd_{Question} \sim t(3,0,10)$$

$$sd_{QuestionIntercept} \sim t(3,0,10)$$

$$sd_{Subject} \sim t(3,0,10)$$

$$sd_{SubjectIntercept} \sim t(3,0,10)$$

$$simplex_{PreRetribution} \sim t(3,0,10)$$

$$simplex_{PreDeterrence} \sim t(3,0,10)$$

$$simplex_{PreCost} \sim t(3,0,10)$$

This analysis revealed that the statistical intervention reduced overall support for the death penalty relative to the coherence-based intervention ( $BF_{10} > 1000$ ,  $\beta_{Statistics} = -0.59$ ,  $SD = 0.11$ , 95% CI [-0.81, -0.36]). A follow-up analysis interacting question with condition indicated that the statistical intervention was more effective at changing people's general death penalty attitudes (i.e., G1 – G4), people's attitudes about the efficacy of capital punishment at deterring crime (D1 – D3), and the cost of capital punishment (C1 – C2;  $BF_{10} = 579$ ) compared to retributive attitudes (R1 – R4, see Figure 1). When predicting only *general* attitudes towards the death penalty on the basis of condition, statistics were still more effective than coherence-based interventions, even when accounting for variability at the item-level,  $\beta_{Statistics} = -0.49$ ,  $SD = 0.21$ , 95% CI [-0.88, -0.08]. This result is consistent with the intuition that for some attitudes, perhaps those that are particularly moral in nature, statistical information is irrelevant.

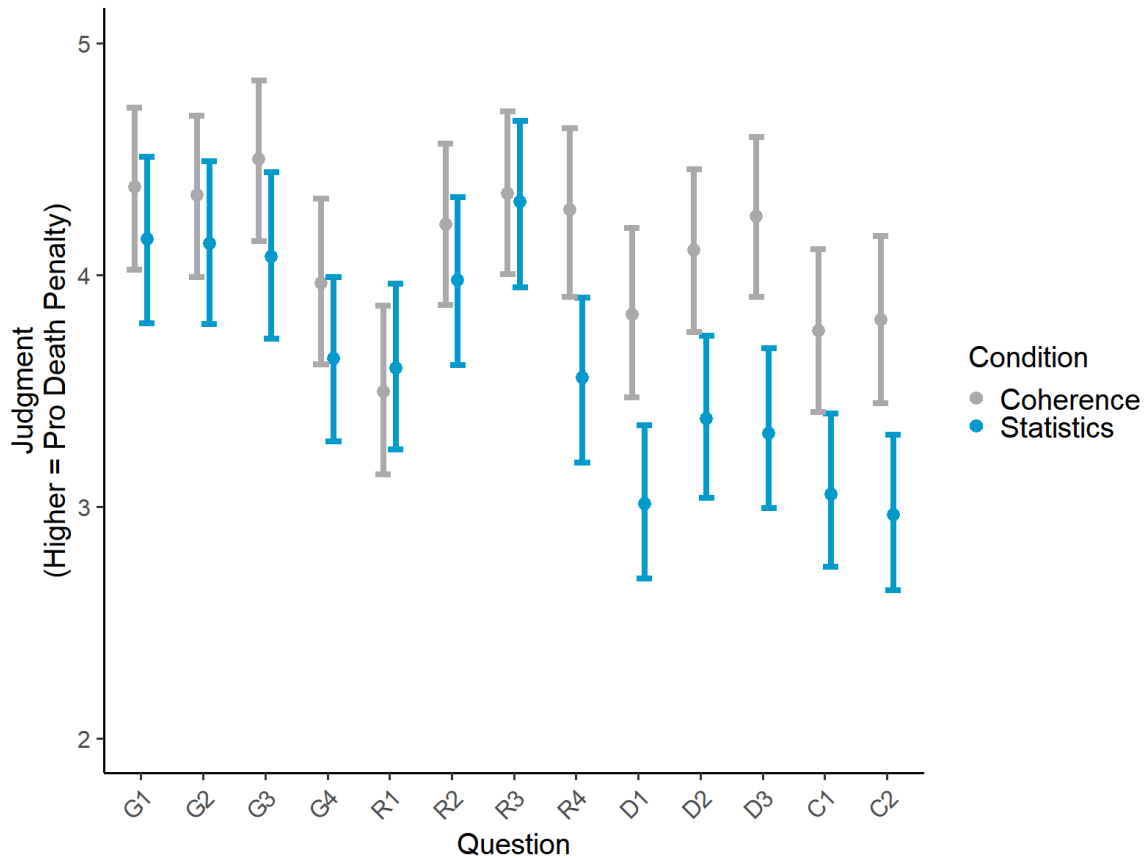


Figure 1. Death penalty attitudes for each scale item in the Coherence and Statistical conditions. Error bars represent 95% Credible Intervals. Participants in the Statistical condition were less likely to endorse the death penalty than participants in the Coherence condition, but this effect varied as function of the question under consideration.

We followed up these analyses by running a series of exploratory analyses examining how deterrence, cost, and retribution attitudes predicted overall post-intervention death penalty attitudes. This model regressed post-intervention death penalty attitudes on each pre-intervention question, allowing us to measure the unique relationship each attitude accounts for in predicting overall death penalty attitudes. Because of the ordinal nature of our predictors, we again treated each as a monotonic effect. These analyses indicated that attitudes about the cost and deterrence of the death penalty were more strongly related to overall attitudes towards the death penalty than the desire for retribution was (see Figure 2).



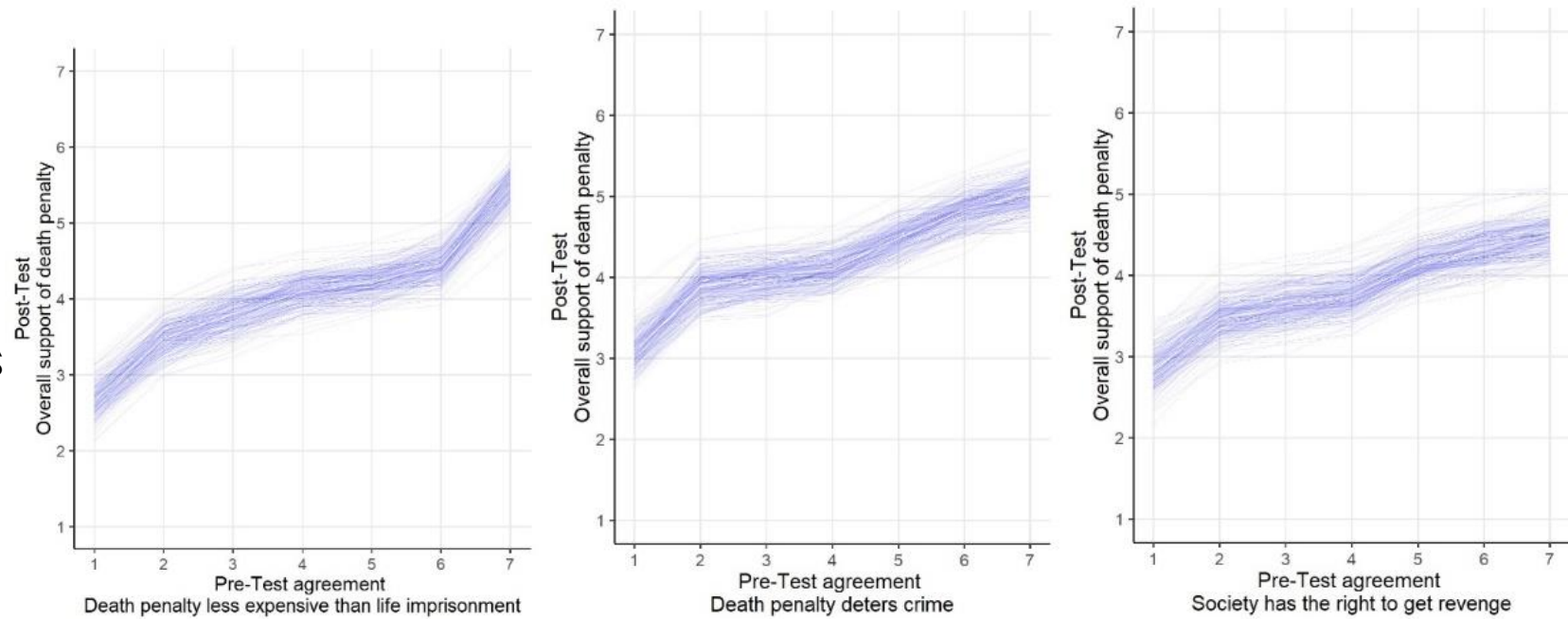


Figure 2. Spaghetti plots of post-intervention death penalty attitudes predicted by pre-intervention attitudes about deterrence (left), cost (middle), and retribution (right), which were treated as a monotonic effect.

## Discussion

We found that statistical interventions were more effective at changing people's death penalty beliefs relative to coherence-based interventions. We also found that beliefs about the cost and the deterrent impact of capital punishment seem to be stronger predictors of people's overall death penalty attitudes. Given that attitudes about deterrence and cost are most easily targeted by statistical interventions, and that these interventions proved to be more effective than a coherence-based intervention, this is further evidence that policy makers interested in shifting attitudes towards the death penalty might focus on the relevant statistics rather than moral imperatives.

However, the results of Study 1 raised questions about what attitudes, beyond those that have been previously assumed to be relevant, are most strongly related to overall death penalty attitudes. Previous research assessing people's views about the death penalty have predominantly focused on people's retributive and utilitarian motives (i.e., people's desire for retribution and belief in the deterrent effect of capital punishment). Furthermore, some studies have used only a few items or a single dichotomous item to measure death penalty attitudes, even though public opinion polls and other research have shown that people's attitudes about this issue are complex and often dependent on the circumstances of the situation (e.g., Murray, 2003; Roberts & Stalans, 2018). Consequently, relatively simple measures such as these are unlikely to provide substantial insight into *why* people endorse the death penalty, and what beliefs and motivations underlie their attitudes. This is not to deny that attitudes about retribution and deterrence are central in shaping people's attitudes about capital punishment. However, because we have reason to think that the effectiveness of interventions likely

depends on the reasons people have for supporting capital punishment, and because of our results in Study 1, we sought to investigate what other related attitudes might be predictive of support for the death penalty. This is the topic of the second section of the paper.

In the next three studies, we sought to determine what other understudied beliefs might also play a significant role in shaping people's attitudes towards capital punishment, and how these beliefs might inform the development of successful interventions. For instance, people may not be familiar with the rate at which innocent people are sentenced to death, or they might not know that most other industrialized countries have abolished the death penalty. If these beliefs are related to support for capital punishment, and could also be changed more easily than beliefs about retribution, then researchers could develop more effective interventions using this information (as shown by Powell, Weismann, & Markman, 2018).

## **Section 2:**

### **Examining Attitudes that Shape Support for Capital Punishment**

In section 2, we systematically investigated what attitudes and motivations surround people's support or opposition to capital punishment, and examined how these attitudes provide insight into the development of effective interventions. What beliefs are most malleable and most relevant to people's death penalty positions? How are these beliefs related and how are they affected by educational interventions? The next three studies sought to address these questions. In Study 2, we explored what attitudes are most relevant to people's endorsement of the death penalty and how these beliefs are related. Studies 3 and 4 were directed at providing a test of an educational intervention which

provided statistics targeting people’s attitudes about wrongful convictions and death sentences – a potentially crucial consideration for those who are opposed to capital punishment. We also explored the relationship between certain auxiliary beliefs—namely, the tendency to blame victims—and death penalty endorsement, as well as how these beliefs might impact the efficacy of an information-based intervention. First, I review the literature on people’s motivations for supporting capital punishment to situate the components of Studies 2 through 4.

### **Motivations for Supporting the Death Penalty**

Prior research examining people’s motivations for supporting capital punishment has consistently found certain motivations and beliefs to be important to people’s overall positions. Two general philosophies of punishment that have been widely discussed in past literature as primary motivations for why people punish are utilitarianism and retributivism (e.g., Weiner, Graham, & Reyna, 1997; Michael, 1992). People driven by utilitarian punishment goals are more focused on reducing the likelihood of future criminal acts by others within society, while those driven by retributive reasons generally value “just deserts,” or seeing criminals get what they deserve.

These motives have often been the primary focus of past research investigating death penalty attitudes. However, research has also found support for other attitudes being importantly related to people’s endorsement of the death penalty, which include: administrative considerations (i.e., problems with execution methods and wrongful death sentences), incapacitation, cost, bias and discrimination, religious reasons, and support for law enforcement (Bohm, Clark, & Aveni, 1990; Bohm & Vogel, 2004; Radelet & Borg, 2000). Other more remote considerations might likewise impact support for capital

punishment. For instance, people may think that those who are on death row, whether guilty or not, are somehow responsible for what happened to them (Janoff-Bulman, Timko, & Carli, 1985). Even more broadly, there are individual differences in people's willingness to think that the world is just (Lerner & Miller, 1978; Lerner, 1980; Hayes, Lorenz, & Bell, 2013). Altogether, Study 2 sought to examine what beliefs are related to support of capital punishment with the aim of revealing how educational interventions might be moderated by individual differences.

## Study 2

In Study 2, we tested what attitudes are most strongly related to people's support or opposition to the death penalty – what attitudes are most malleable and most central to people's endorsement of the death penalty?

### Method

We conducted an exploratory correlational study examining the relationship between previously-theorized attitudes (e.g., retribution and deterrence, Finckenauer, 1988; Carlsmith, Darley, & Robinson, 2002) and other understudied attitudes (e.g., the importance of wrongful convictions and perceptions of execution methods) that we hypothesized may be most strongly related to people's general death penalty attitudes.

**Preregistration.** Our sample size and study materials were preregistered through the Open Science Framework [here](#).

**Participants.** We recruited 249 participants through Amazon Mechanical Turk. After excluding participants who failed attention checks, 184 participants remained for our final sample (45% female,  $Mdn_{age} = 33.5$  years old). Participants were paid \$0.70 for participating in the study.

**Procedure.** Participants were asked to rate how much they agreed with statements which composed 12 subscales about capital punishment, the criminal justice system, and other related topics. These attitudes are described in more detail below. After answering these questions, participants provided demographic information.

**Death Penalty Attitudes.** We measured 11 attitudes (54 items total) that we hypothesized would be relevant to people's death penalty attitudes, many of which were suggested by previous studies but not included in most death penalty measures. We again measured attitudes about *Retribution*, *Deterrence*, and *Cost*. The other attitudes we included were: (1) Providing rehabilitation programs for offenders is a good idea (*Rehabilitation*), (2) Innocent people are sometimes sentenced to death and this is a major concern with using the death penalty (*Innocence*), (3) People who are wrongfully convicted of serious crimes must have done something wrong to be in that situation (*Victim Blame*), (4) The death penalty is barbaric (*Barbarity*), (5) The United States has a great deal of crime (*Crime*), (6) America's execution methods are humane (*Humane*), (7) Other countries similar to America have the death penalty (*Common*), and (8) Torture is acceptable in some cases (*Torture*). Our scales and items were adapted from the Death Penalty Attitudes Questionnaire (O'Neil et al., 2004), the Violence-Related Attitudes and Beliefs Scale (Brand & Anastasio, 2006), and a study by Jiang and colleagues (Jiang, Lambert, Wang, Saito, & Pilot, 2010). Participants rated how much they agreed with each statement on a 7-point Likert scale (1 = "Strongly disagree, 7 = "Strongly agree"; Cronbach's  $\alpha$  for all scales were  $> .70$ ). For the complete list of materials and scales, see the SOM located [here](#).

## **Results**

We predicted that each of the 11 attitudes measured would be related to people's overall support for capital punishment, and as expected, all attitudes were correlated with participants' overall death penalty attitudes (see Figure 3). Deterrence, retribution, and the importance of innocence were among the most highly correlated attitudes with general endorsement of the death penalty. However, other attitudes exhibited surprisingly strong relationships with general support of the death penalty as well. For example, participants who endorsed the death penalty were also more likely to think that exonerated people were still nonetheless guilty or partially responsible for being wrongfully convicted (*Victim Blame*;  $T_b = .42$ ). Strikingly, approximately 28% of participants agreed in some fashion with the idea that wrongfully convicted people on death row were responsible for their conviction ( $> 4 =$  "Somewhat agree" to "Strongly agree"). Likewise, general endorsement of the death penalty was positively correlated with thinking that many countries also have the death penalty (*Common*;  $T_b = .32$ ). These findings highlight the complexity of reasons people may have for supporting capital punishment.

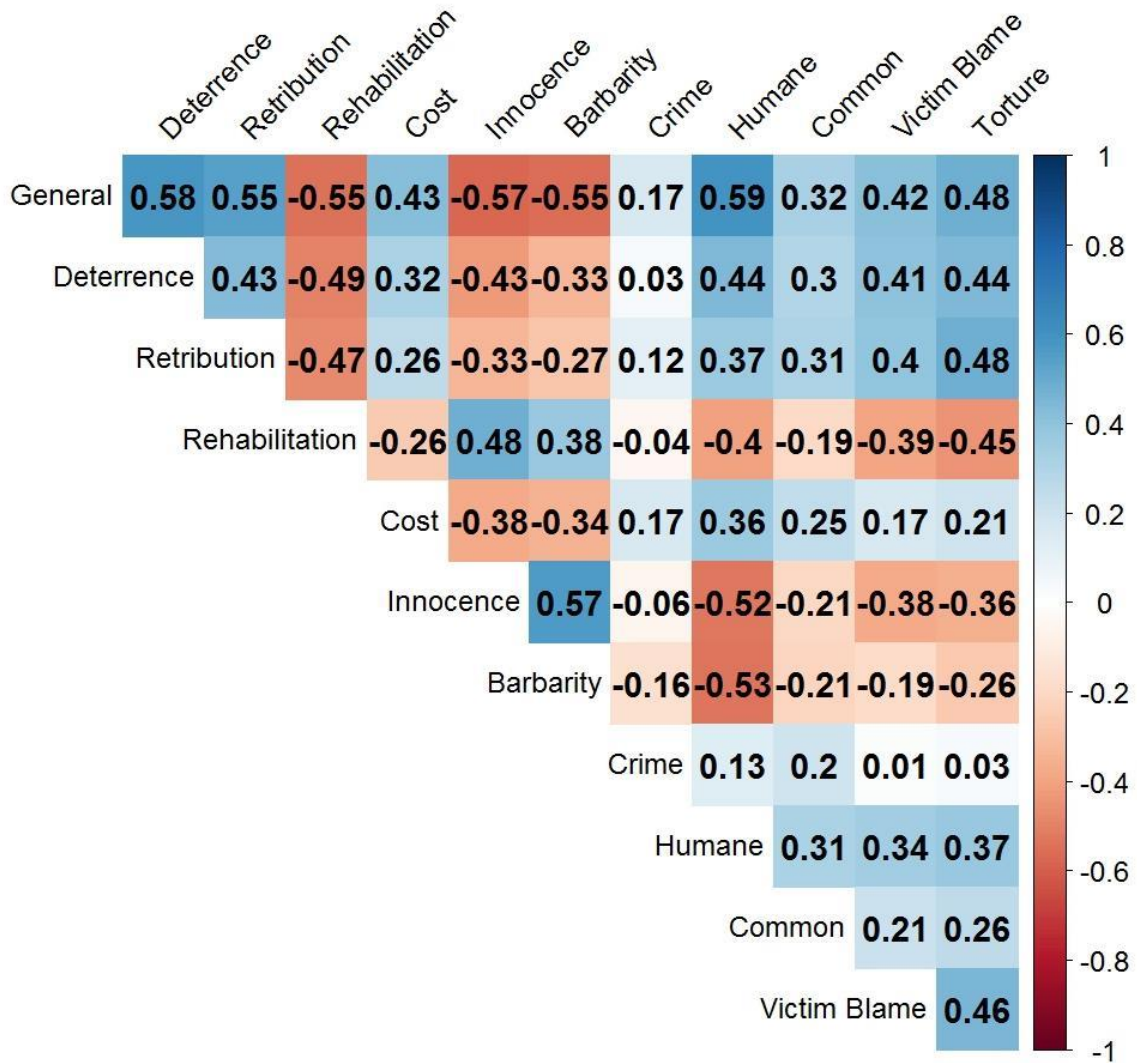


Figure 3. Kendall's tau correlation coefficients of death penalty attitudes in Study 2. Shades of blue indicate a positive correlation and shades of red indicate a negative correlation between two attitudes.

### Discussion

We found that multiple beliefs were related to people's decisions to support or oppose capital punishment. Additionally, Study 1 revealed that statistical interventions are more effective than coherence-based interventions. These results motivated our next two studies. In both studies, we sought to test: (1) whether information about the rate of



wrongful death sentences would shift death penalty attitudes, and (2) how auxiliary beliefs correlated with support for the death penalty—namely, the tendency to victim blame—would moderate the effect of an intervention.

### **Study 3**

In Study 3, we investigated how auxiliary beliefs—namely, the tendency to blame the victim—might moderate the effectiveness of an educational intervention highlighting problems with the implementation of the death penalty. In Study 2, we found that participants' tendencies to blame innocent people who are wrongfully sentenced with the death penalty was correlated with pro-death penalty attitudes. In light of these results, we aimed to test whether an intervention that highlights the frequency of innocent people being wrongfully convicted and sentenced to death would be less effective for people who believe that wrongfully convicted individuals are somewhat responsible for their convictions. We also aimed to test whether this would occur for people who engage in blaming victims more generally. Additionally, we explored several other questions surrounding people's knowledge of the administration of the death penalty. For example, how many innocent prisoners do laypeople think are on death row? What are people's subjective thresholds regarding how much error they are willing to accept in the administration of the death penalty? Study 3 sought to address these questions.

### **Method**

Study 3 used a quasi-experimental design in which all participants would first complete a survey which contained our pre-intervention measures, followed by a second survey that would include an intervention followed by our post-intervention measures. However, because of problems with the internal reliability and interpretability of the

scales we created, we did not implement the second phase of the study in order to correct these issues.

**Preregistration.** The data collection plan, predictions, and analysis scripts for our study were preregistered through the Open Science Framework. Experimental scripts, analyses, and supplemental materials are available [here](#).

**Participants.** We recruited 1,600 participants through Amazon Mechanical Turk. Our sample size was predetermined by conducting a power analysis to detect a Pearson's  $r$  of .07 with 80% power. The power analysis recommended a sample size of 1,200 participants—but because we anticipated losing participants who would not complete both phases of the study, or would not pay attention—we recruited 1,600 participants. After excluding participants who failed attention checks, 1,446 participants remained for our final sample (54% female,  $Mdn_{age} = 36$  years old). Each participant was compensated \$0.50 for completing the study.

**Procedure.** The pre-intervention survey proceeded as follows: First participants were asked to provide estimates for how many innocent people have been executed, as well as sentenced to death but not yet executed in the United States. They were also asked for their opinions on how much error we should accept in the administration of the death penalty. After answering these questions, participants rated how much they agreed with statements that measured their attitudes about the death penalty. Then they completed measures that assessed their knowledge and beliefs about innocent people being wrongfully sentenced to death. Finally, participants responded to questions that measured their tendencies to blame people who are wrongfully sentenced with the death

penalty, and their tendencies to blame victims in general. Participants also provided general demographic information.

**Measures.** Participants were asked to complete multiple measures that assessed their beliefs towards the death penalty and other relevant topics (40 questions in total). Most items were directly adapted from or inspired by previous studies' measures. Participants rated their agreement with statements on a 7-point Likert scale (1 = "Strongly disagree, 7 = "Strongly agree") for all measures except for the innocence estimates. Each of these measures is described in more detail below.

***Death penalty attitudes.*** Participants rated how much they agreed with statements assessing their beliefs regarding cost, deterrence, and retribution, as well as their general support for the death penalty. These items were selected from the same three studies mentioned in Study 2 (O'Neil et al., 2004; Brand & Anastasio, 2006; Jiang et al., 2010). The scale included seven items for general death penalty support, four items for retribution, three items for deterrence, and two items for cost. An example of one of the items measuring general support for the death penalty (labeled G1 – G7 in Figure 5) was, "I am in favor of the death penalty." The items for beliefs about retribution, deterrence, and cost were the same as they were in Study 1.

***Innocence estimates and subjective error rate.*** Participants were asked to provide estimates for: (1) The number of innocent people who have been executed since 1976 (out of 1,488 executions), and (2) The percentage of people who are innocent out of those who are currently on death row and out of those who have previously served time on death row who have not been executed. After providing these estimates, participants provided what I will refer to as their *subjective error rate*. This third question asked

participants to provide a percentage of people who can be wrongfully sentenced with the death penalty before it becomes too many to justify continuing to use the death penalty. Participants were required to enter a numerical value as their estimate for the first question, and percentages for the second and third questions. The *innocence estimates* were designed to try to determine participants' initial knowledge and attitudes about how often people are wrongfully sentenced to death and wrongfully executed. The *subjective error rate* was a subjective measure of how much error people think we should accept in the administration of the death penalty.

***Innocence awareness.*** The innocence awareness scale assessed the degree to which people were aware that innocent people are sentenced to death. An example of an item from this scale was, "Innocent people are sometimes sentenced to death."

***Concern for innocence.*** The concern for innocence items were designed to measure participants' opinions about how serious the issue of wrongful convictions is for the administration of the death penalty. More specifically, these items measured the degree to which participants agreed with the notion that the death penalty should not be used because of the possibility of sentencing innocent people to death. An example of one of these items was, "Even if there is a possibility of sentencing innocent people to death, we should still use the death penalty" (reverse scored).

***Specific victim blame.*** We developed a scale measuring victim blaming specifically in the context of wrongful convictions. This scale included questions measuring the extent to which participants blamed people who are wrongfully sentenced to death, or felt that they are somewhat responsible for being wrongfully convicted. For

instance, one item was, “People who are wrongfully sentenced with the death penalty are somewhat responsible for their sentence.”

*General victim blame.* The general victim blame scale was designed to measure people’s general tendencies to blame victims across a variety of different scenarios and situations. These items were inspired by a previous study which included various short scenarios in which victims experienced some sort of harm or unfortunate event (Powell & Horne, 2018). We modified these items to include statements about each victim’s level of responsibility or blame for the unfortunate event. For example, people rated their agreement with the following, “A man walking in downtown Detroit was mugged at 2 am. The man is somewhat responsible for getting mugged.”

### **Predictions**

We hoped to examine whether a statistical intervention’s effectiveness would be moderated by participants’ tendency to blame people who are wrongfully sentenced to death, and their tendency to blame victims more generally. We expected pro-death penalty attitudes to be positively correlated with victim blaming tendencies (both general and specific). We also hypothesized that participants who had a higher tendency to blame victims would be less affected by the intervention compared to participants who had lower victim blaming tendencies. More specifically, we predicted that participants lower on victim blaming would revise their beliefs to be less supportive of capital punishment to a greater extent than participants higher on victim blaming. We expected to observe these effects in participants’ beliefs about the likelihood of wrongful convictions, beliefs about how serious the issue of wrongful convictions is in the administration of the death penalty, and overall attitudes towards the death penalty. We also expected all of these

effects to hold over and above pre-intervention support for the death penalty. However, as discussed, because we did not complete the second phase of the study, we only examined the predicted relationships between victim blaming and various death penalty attitudes.

## **Results**

As in Study 2, we found that participants' tendencies to blame people who are wrongfully sentenced with the death penalty were related to their general support for the death penalty (see Figure 4 below for all correlations). Death penalty support was also related to people's general tendencies to blame victims. Additionally, the more participants supported the death penalty, the more likely they were to provide lower estimates for how many people are wrongfully executed and sentenced to death. Further, we found that pro-death penalty participants also tended to tolerate higher error rates in the administration of the death penalty. Not surprisingly, participants' concern about innocent people being sentenced to death was negatively correlated with support for capital punishment, as these items measured the extent to which participants opposed capital punishment because of the possibility of executing innocent people.

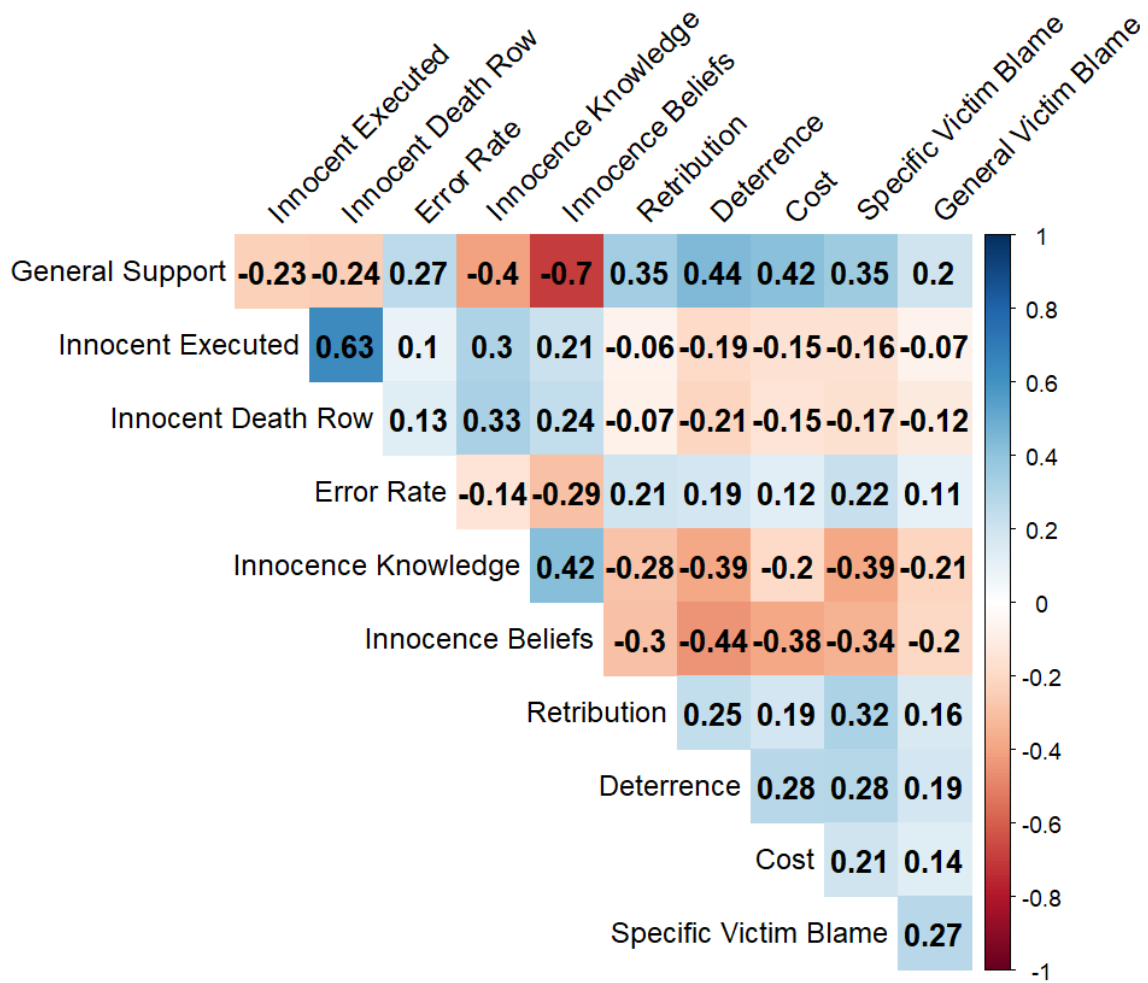


Figure 4. Kendall's tau correlation coefficients of death penalty attitudes in Study 3. Shades of blue indicate a positive correlation and shades of red indicate a negative correlation between two attitudes.

## Discussion

While examining the correlational results from the pre-intervention survey, we found issues with some of our measures that we thought were necessary to resolve before testing the possible interaction between victim blaming and an intervention highlighting the prevalence wrongful death sentences. First, text entries in the survey were often unclear. For instance, in the case of providing estimates of the number of innocent people on death row, participants entered percentage estimates that were unclear (e.g., .5 – which could mean 50% or one-half of a percent). For the general victim blame scale, there were

issues with the internal reliability for one of the items (item 3), and some of the items were not phrased consistently with the rest of the scale (items 7 and 10). Thus, we revised these measures before testing our hypotheses in Study 4.

### **Study 4**

In Study 4, we investigated whether people's tendency to blame victims would moderate the efficacy of an educational intervention highlighting the frequency of wrongful death sentences and convictions in America.

### **Method**

We revised three measures from Study 3 and conducted a between-subjects experimental design rather than a quasi-experimental design. All participants received the same pre-intervention and post-intervention measures, however participants were randomly assigned to either the innocence intervention or an unrelated control condition. Beyond these changes, the structure and predictions of Study 4 were similar to those of Study 3.

**Preregistration.** The data collection plan, predictions, and analysis scripts for our study were preregistered through the Open Science Framework. Experimental scripts, analyses, and supplemental materials are available [here](#).

**Participants.** We recruited 969 participants through Amazon Mechanical Turk. Our sample size was predetermined by conducting a power analysis to detect a Cohen's  $d$  of 0.2 with enough precision that our Type-M error rate for this effect size would be no greater than 1.1 (Gelman & Carlin, 2014). The power analysis recommended a sample size of 876 participants—but because we anticipated removing approximately 10% of participants who did not pay attention—we recruited 969 participants. After excluding



participants who failed attention checks, 865 participants remained for our final sample (61% female,  $Mdn_{age} = 36$  years old). Each participant was compensated \$0.80 for completing the study.

**Procedure.** In order to test the interaction between death penalty attitudes and victim blaming tendencies, we used a between-subjects design, in which half of the participants were randomly assigned to the innocence intervention and half were assigned to the control condition.

The study proceeded as follows: First participants were asked to rate how much they agreed with statements assessing their general tendency to blame victims. We measured this first because it was in no clear way related to subsequent questions and interventions concerning the death penalty. After completing this portion of the study, participants rated their agreement with four pre-intervention statements that measured their attitudes towards capital punishment (namely; general support, deterrence, cost, and retribution). Next, participants read information from either the innocence condition or the control condition. After reading this information, participants provided estimates of wrongful death sentence rates, wrongful execution rates, and their error tolerances. They then rated how much they agreed with statements measuring their overall attitudes about the death penalty. Then participants completed measures that assessed their knowledge and beliefs about innocent people being wrongfully sentenced to death, and their tendencies to blame people who are wrongfully sentenced. Finally, participants answered general questions about their knowledge of and opinion towards the criminal justice system, and provided general demographic information.

**Revised measures.** Participants were asked to complete multiple measures that assessed their beliefs towards the death penalty and other relevant topics (52 questions in total). Participants rated their agreement with statements on a 7-point Likert scale (1 = “Strongly disagree, 7 = “Strongly agree”) for all measures except for the innocence estimates and subjective error rate. All measures are the same from Study 3, except for the revised and additional measures which are described in more detail below.

***Pre-intervention death penalty attitudes.*** Prior to the intervention and control, participants received four statements that assessed their initial attitudes about retribution, deterrence, cost, and general support of the death penalty. Each of the four statements was taken from the death penalty attitudes measure in Study 3. The pre-intervention statement that assessed participants’ general support of the death penalty was, “I support the death penalty.”

***Post-intervention death penalty attitudes.*** The post-intervention death penalty attitudes scale was the same as the death penalty attitudes measure from Study 3.

***Innocence estimates and subjective error rate.*** Because participants entered percentage estimates that were unclear (e.g., .5 – which could mean 50% or one-half of a percent), we revised the two questions asking participants to provide a percentage to have participants use a rating scale from 0% to 100% rather than having people enter a number.

***Innocence intervention.*** For the innocence intervention, we summarized the statistical information contained in videos taken from the Innocence Project which highlight the estimated rate of wrongful death sentences and wrongful convictions in America. We also included an icon array (i.e., an infographic representing a proportion of

a population) to supplement a statistic that indicated how many innocent people have been sentenced to death in the United States (see Lewandowsky, Gignac, & Vaughan, 2013; Nyhan & Reifler, 2018). The statistical information included in the intervention was obtained from the DPIC, the National Registry of Exonerations, and empirical research on wrongful convictions and death sentences (Gross, O'Brien, Hu, & Kennedy, 2014).

***Control condition.*** Participants in the control condition read information about the Alford plea – a guilty plea which allows the defendant to maintain his or her innocence despite pleading guilty (Hykel Cuddy, 2011). This information was chosen so that it would be relevant to the questions in the study, but in no way directly bear on support or opposition to the death penalty.

***Criminal justice attitudes.*** The criminal justice attitudes scale was used to assess people's subjective knowledge about the American criminal justice system, as well as their biases or skepticism towards different facets of the criminal justice system. An example of one of these items was, "Circumstantial evidence is too weak to use in court."

## **Predictions**

Our predictions remained the same as they were in Study 3, but with an added effect of condition. We hypothesized that there would be an interaction between participants' victim blaming tendencies and condition on their post-intervention death penalty support. More specifically, for the innocence intervention condition, we expected that pro-death penalty participants with higher victim blaming tendencies would be more resistant to the intervention, and therefore less likely to revise their beliefs to be less supportive of the death penalty. We expected to observe these effects in participants'

beliefs about the likelihood of wrongful convictions, beliefs about how serious the issue of wrongful convictions is for the use of the death penalty, and general support for the death penalty. We again expected all of these effects to hold over and above pretest support for the death penalty.

### **Analytic Approach**

We performed Bayesian mixed-effects modeling using the R package *brms* (Bürkner, 2018). We used our previous data to determine our priors. For population-level effects of interest (i.e., Condition  $\times$  Victim Blame), we set regularizing priors: namely, a normal distribution with a mean of 0 (i.e., no effect) and a standard deviation of 1. These priors are recommended because they provide conservative effect size estimates and reduce the likelihood of overfitting (Gelman et al., 2015; McElreath, 2016). For group-level effects we set generic weakly-informative priors: that is, a normal distribution with a mean of 1 and a standard deviation of 3. The details of these models are available on the Open Science Framework.

### **Results**

First, we tested whether the innocence intervention would reduce general support for the death penalty. In order to test this, we performed Bayesian ordinal mixed-effects modeling, predicting post-intervention support for the death penalty on the basis of condition (1 = Innocence, 0 = Control), controlling for participants' average pre-intervention death penalty attitudes. This model treated both participants and scale items as group-level effects, allowing for heterogeneity in the intercept for each participant and question (Judd et al., 2012). The model is specified below in the syntax of *brms*, (Bürkner, 2018; also see Bates, Mächler, Bolker, & Walker, 2015):

Response ~ Condition + PreDeathPenaltyAverage + (1 +  
Condition|Question) + (1|Subject)

To model the joint probability distribution of participants' responses, we specified the following priors over the possible effects each variable could have on our response variable:

$$\beta_{Intercept[1]} \sim N(-1.73, 0.25)$$

$$\beta_{Intercept[2]} \sim N(-1.05, 0.25)$$

$$\beta_{Intercept[3]} \sim N(-0.49, 0.25)$$

$$\beta_{Intercept[4]} \sim N(0.32, 0.25)$$

$$\beta_{Intercept[5]} \sim N(1.10, 0.25)$$

$$\beta_{Intercept[6]} \sim N(1.99, 0.25)$$

$$\beta_{Innocence} \sim N(0, 1)$$

$$\beta_{PreDeathPenaltyAverage} \sim N(2, 3)$$

$$sd_{Question} \sim N(1, 3)$$

$$sd_{QuestionInnocence} \sim N(1, 3)$$

$$sd_{QuestionIntercept} \sim N(1, 3)$$

$$sd_{Subject} \sim N(1, 3)$$

$$sd_{SubjectIntercept} \sim N(1, 3)$$

This analysis showed that the innocence intervention reduced participants' general support for the death penalty,  $\beta_{Innocence} = -0.58$ ,  $SD = 0.16$ , 95% CI [-0.88, -0.27]. A follow up analysis interacting question with condition revealed that the intervention effectively reduced participants' general support for capital punishment, but did not affect other attitudes they had towards the death penalty regarding retribution and deterrence

(see Figure 5,  $\beta_{Innocence} = -0.18$ ,  $SD = 0.13$ , 95% CI [-0.42, 0.08]). However, when predicting only beliefs about the cost of the death penalty, this analysis showed that participants in the innocence condition were less likely to believe that the death penalty is cheaper than life imprisonment compared to participants in the control condition ( $\beta_{Innocence} = -0.41$ ,  $SD = 0.19$ , 95% CI [-0.79, -0.04]).

Next, we tested whether general victim blaming tendencies moderated the effect of condition. Neither of these analyses revealed an interaction between condition and victim blaming, however. Of note, many participants agreed with the idea that people who are wrongfully sentenced to death are responsible for being sentenced (around 19%), or engaged in victim blaming more generally (28%,  $> 4 =$  “Somewhat agree” to “Strongly agree”).

We also ran the same models as above predicting concern for innocence and innocence awareness (in separate models), and found that the intervention effectively increased participants’ beliefs about people being wrongfully sentenced with the death penalty ( $\beta_{Innocence} = 1.06$ ,  $SD = 0.22$ , 95% CI [0.63, 1.49]) but the intervention did not affect participants’ beliefs that the problem of wrongful convictions is serious enough to abolish the death penalty (see Figure 6,  $\beta_{Innocence} = 0.12$ ,  $SD = 0.20$ , 95% CI [-0.27, 0.52]).

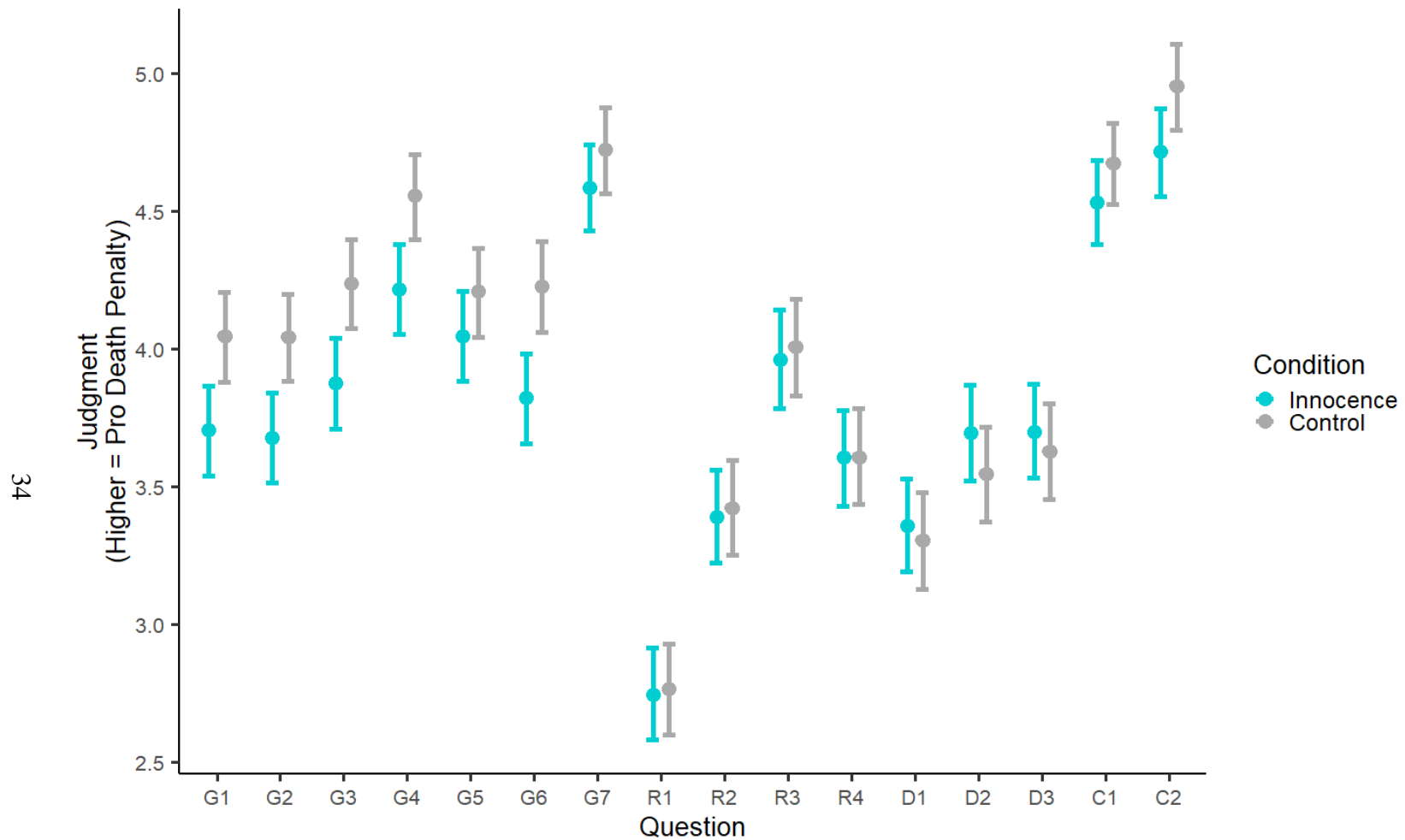


Figure 5. Death penalty attitudes for each scale item in the Innocence and Control conditions. Error bars represent 95% Credible Intervals. Participants in the Innocence condition were less supportive of capital punishment and were also less likely to endorse the belief that the death penalty is cheaper than life without parole compared to participants in the Control condition. However, participants' judgments did not differ between conditions for questions about retribution and deterrence.

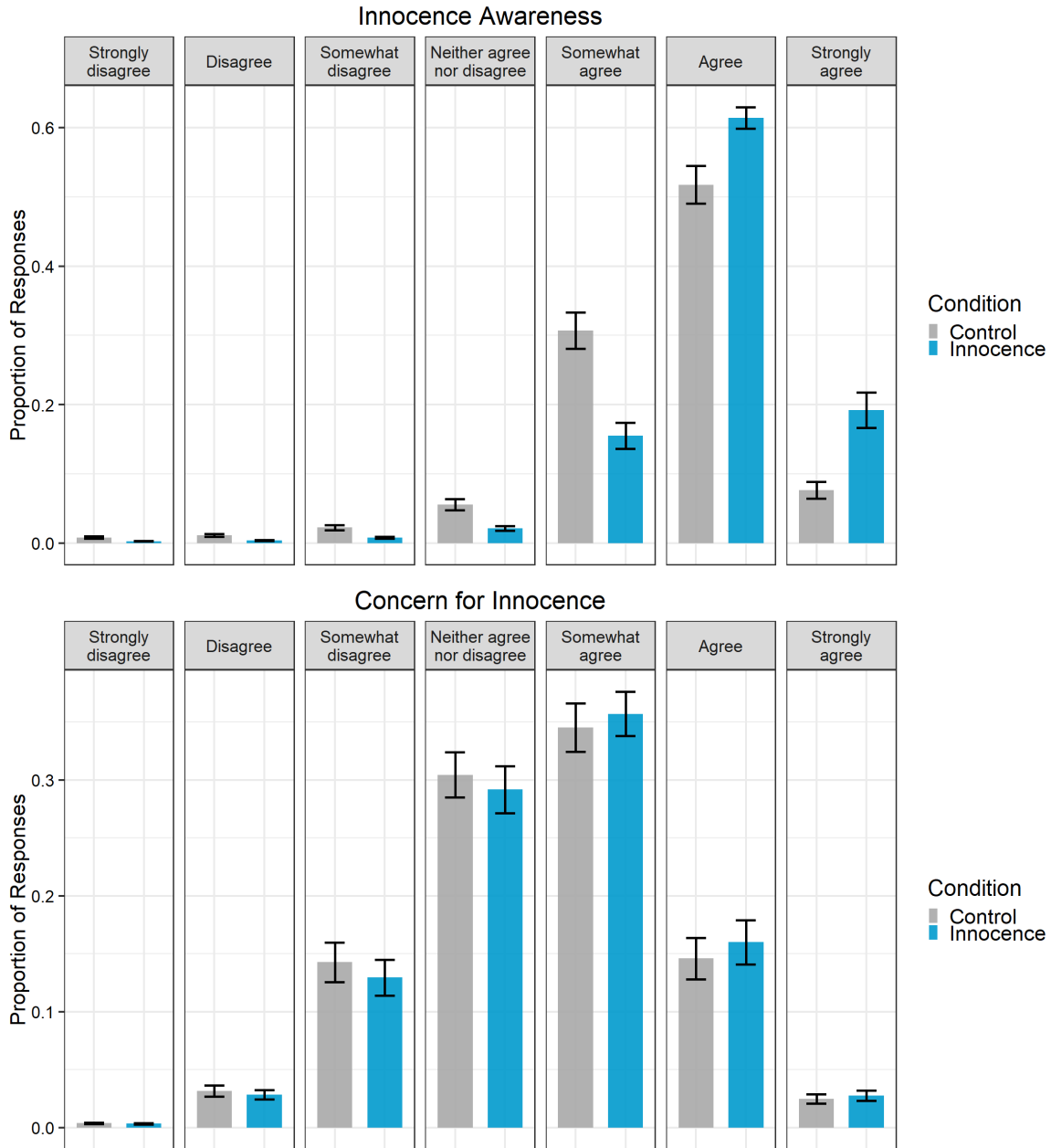
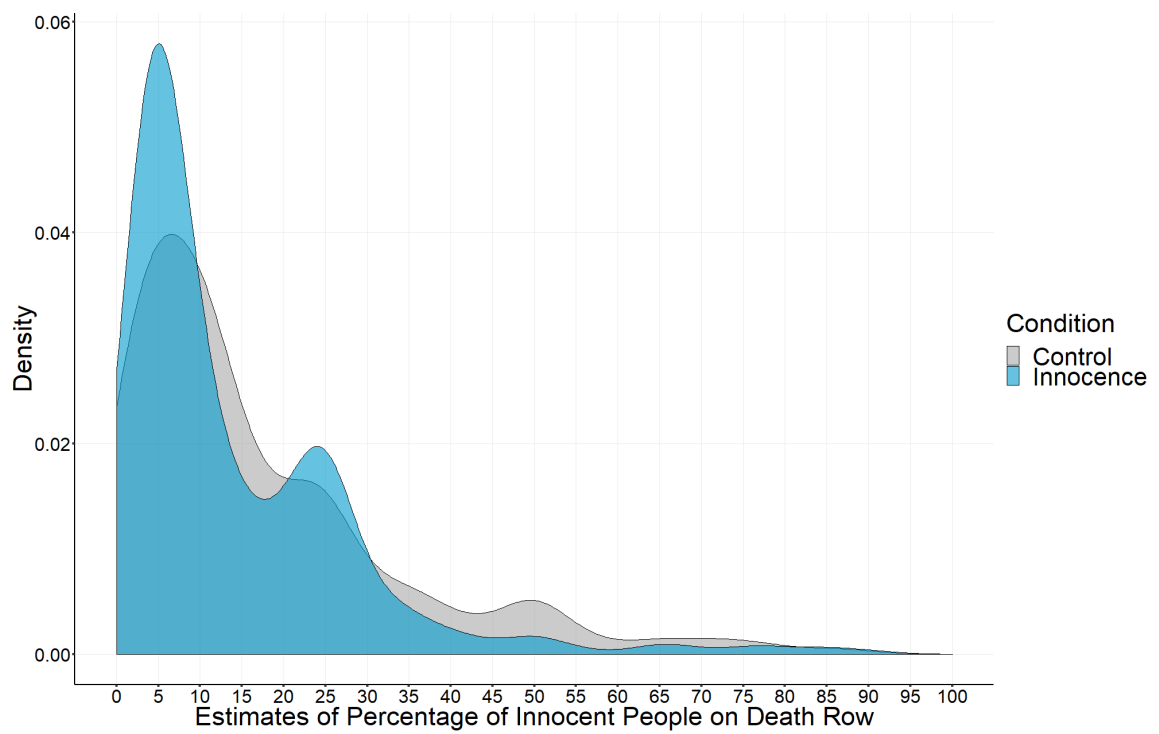
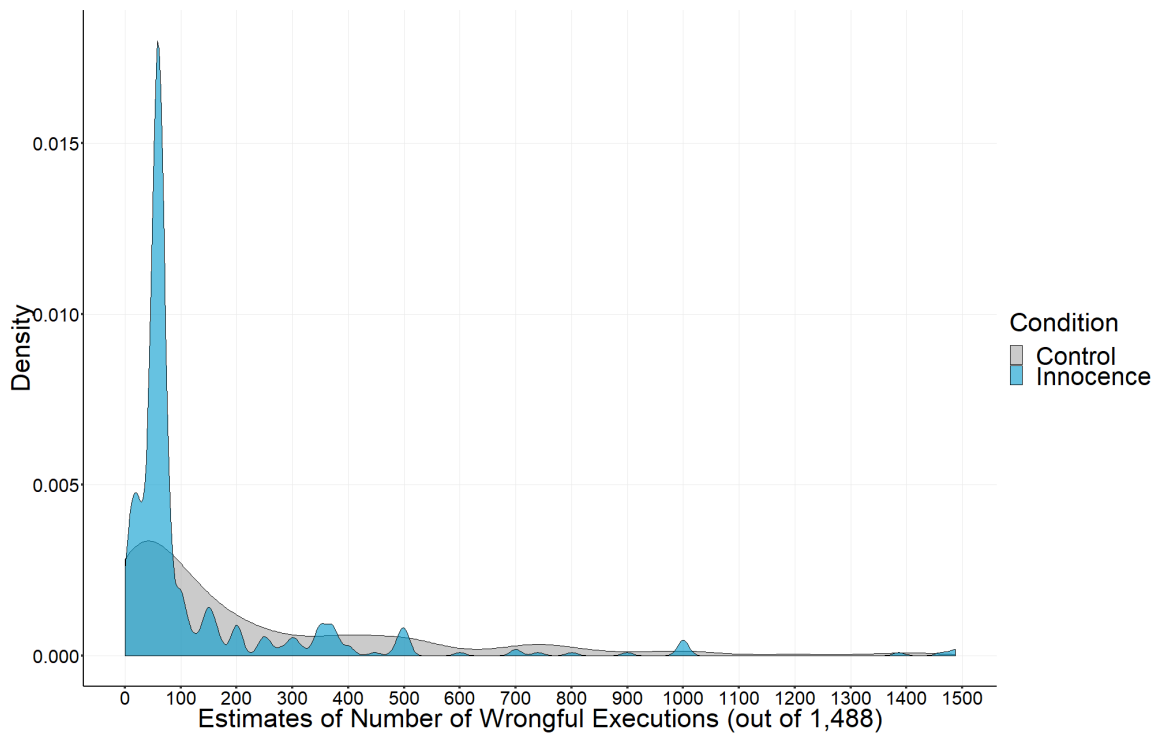


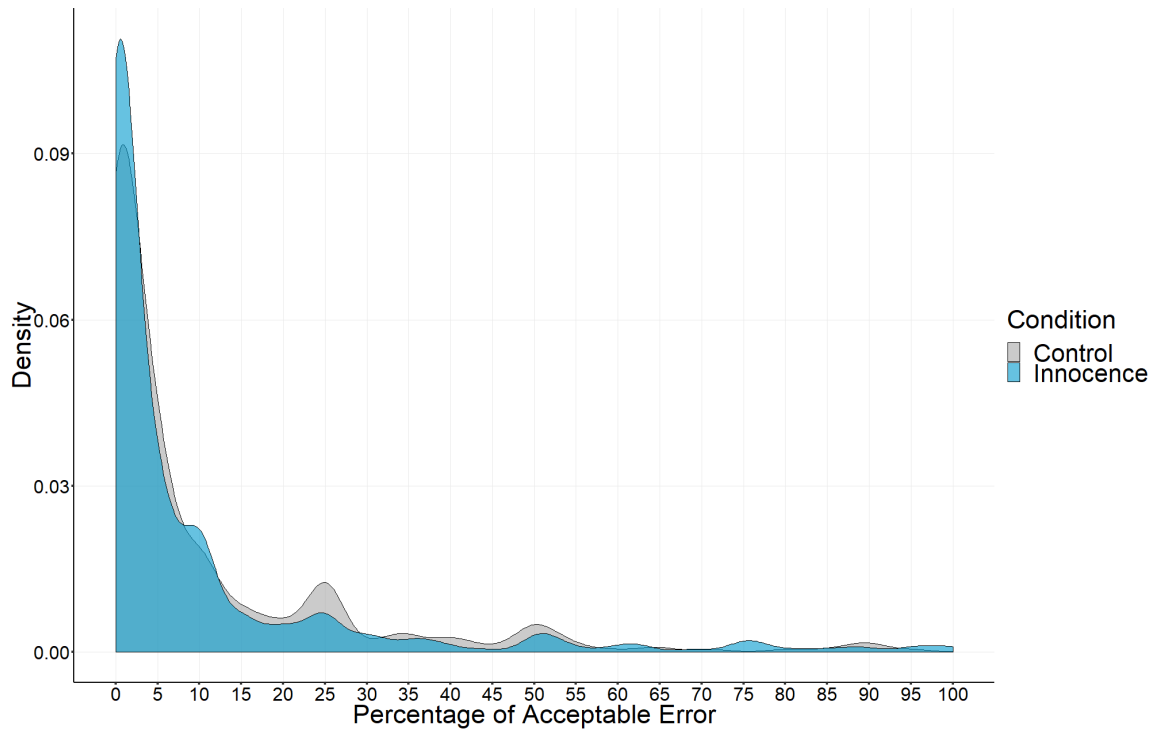
Figure 6. Innocence Awareness (top) and Concern for Innocence (bottom) for the Innocence and Control conditions. Error bars represent 95% Credible Intervals. Participants in the Statistical condition were more likely to endorse the belief that innocent people are wrongfully sentenced to death compared to participants in the Control condition. However, participants' responses did not differ between conditions for questions about how problematic wrongful death sentences are for supporting the death penalty.



Participants' innocence estimates differed between conditions in that participants in the innocence condition actually provided *lower* estimates compared to the control condition, for both the estimated number of wrongful executions ( $\beta_{Innocence} = -0.54$ ,  $SD = 0.08$ , 95% CI [-0.70, -0.39]) as well as the estimated percentage of innocent people on death row ( $\beta_{Innocence} = -0.21$ ,  $SD = 0.06$ , 95% CI [-0.33, -0.09]). However, although participants who received the innocence intervention provided lower estimates on average compared to participants in the control condition, they provided considerably more accurate estimates (see Figure 7). Therefore, the innocence intervention seemed to give participants a better representation of the error rates in the administration of the death penalty. Interestingly, participants in the innocence condition more frequently provided lower subjective error rates for how much error they thought we *should* accept in administering the death penalty (see Figure 8,  $\beta_{Innocence} = -0.09$ ,  $SD = 0.12$ , 95% CI [-0.33, 0.15]).



*Figure 7.* Density plots of participants' estimates for the number of innocent people who have been executed (top) and the percentage of innocence people on death row (bottom) for the Innocence and Control conditions.



*Figure 8.* Density plot of participants' responses for the maximum percentage of error they would accept in the administration of the death penalty for the Innocence and Control conditions.

## Discussion

We found that the innocence intervention effectively reduced participants' general support for the death penalty, and increased their agreement with the fact that people are wrongfully sentenced with the death penalty. However, we did not find support for the prediction that the effectiveness of an informational intervention highlighting the frequency of wrongful death sentences would be moderated by people's victim blaming tendencies. Although there was no interaction between condition and the tendency to victim blame, the positive relationship between pro-death penalty attitudes and blaming people who are wrongfully sentenced to death still remains. Nevertheless, these results seem positive in that even if some people blame individuals who are wrongfully convicted to some extent, this does not prevent them from taking relevant statistical

information into account. In other words, these results suggest that belief revision is still possible for people who have these types of biases.

The innocence intervention also seemed to help participants make more accurate estimates for how many people are wrongfully executed and sentenced to death. Furthermore, participants in the innocence condition also provided lower subjective error rates, suggesting that the intervention not only made them more knowledgeable, but may have also made people more sensitive to the implications these errors have for the death penalty.

### **General Discussion**

Over half of the people in the United States support the use of the death penalty today, yet are unaware of the statistics surrounding the deterrent effects and cost of the death penalty. Furthermore, there have been few systematic investigations into the attitudes, both proximal and remote, that may shape people's support for the death penalty. In Study 1, we examined how different types of interventions shift people's attitudes about the death penalty. We found that statistical interventions reduced support for the death penalty, and that these effects were largest for general death penalty attitudes, and attitudes about cost and deterrence. Furthermore, we found that statistical interventions were ineffective at changing attitudes motivated by retribution. Because retribution falls unambiguously within the moral domain, people likely think that statistics are irrelevant to questions of whether criminals should get what they deserve.

Study 1 also revealed that retribution is not the only relevant, or even primary, factor driving people's death penalty attitudes – beliefs about deterrence and cost were also strong predictors of overall endorsement of the death penalty. The results of Study 1

led us to examine what other attitudes, which have perhaps gone unexplored, may shape attitudes towards the death penalty (see Powell et al., 2018). Study 2 revealed that many relatively “remote” attitudes were strongly correlated with endorsement of the death penalty. Of note, we observed a relationship between general death penalty attitudes and the belief that people wrongfully sentenced are to some degree responsible for their wrongful imprisonment. From an interventionist perspective, Study 2 also uncovered that many of the attitudes associated with support for the death penalty—for instance, beliefs about innocence and commonality—can be directly addressed by citing statistics. No moral imperative is required.

In Studies 3 and 4 we, found that an educational intervention targeting participants’ beliefs about innocence was effective in reducing general support for the death penalty and increasing participants’ awareness about the rate of wrongful death sentences. Conversely, the innocence intervention did not affect beliefs about deterrence, retribution, or beliefs about how serious the issue of wrongful death sentences is for the use of capital punishment. Although we did not find that victim blaming tendencies moderated the effectiveness of the innocence intervention, a seemingly positive result, it is still important to note the relationship we observed between victim blaming and support for the death penalty, and consider potential implications of this relationship.

### **Potential Implications of Victim Blaming**

What implications might there be for the positive relationship between people’s support for the death penalty and their tendency to blame victims? We know from previous research that there are meaningful individual differences between those who are death-qualified (i.e., very pro-death penalty) and those who oppose capital punishment or

have more neutral positions. For instance, one study revealed that participants who were considered death-qualified under the Witherspoon standard (i.e., those willing to impose the death penalty) were more likely to vote guilty compared to participants were not always willing to impose the death penalty (Cowan, Thompson, & Ellsworth, 1984). Perhaps another way pro-death penalty individuals might differ from people who are less supportive of capital punishment is that they are more likely to have cognitive biases that lead them to blame victims more frequently (Janoff-Bulman et al., 1985). This could be problematic for cases that require death-qualified jurors, as jurors should ideally be objective and unbiased. Additionally, the relationship between supporting the death penalty and victim blaming could negatively affect death-qualified jurors' ability to effectively interpret mitigating factors during the sentencing phase for capital cases.

### **New Insight into Death Penalty Attitudes**

Our findings provide us with new knowledge about how people think and reason about the death penalty. From these studies we learned that people generally tend to endorse retributive beliefs, however retributive attitudes are less predictive of people's support for capital punishment. This contradicts past literature that found retribution to be the strongest reason for Americans' support for the death penalty (e.g., Jiang et al., 2010). Based on our findings, it seems plausible that people often endorse the idea of retribution but may ultimately decide not to support the death penalty because of problematic considerations such as capital punishment not being an effective deterrent, or the possibility of executing innocent people. However, if people are not informed about these issues—and, for example, believe that the death penalty is cheaper compared to life in

prison without the possibility of parole—then they seem to be most likely to support capital punishment.

### **Limitations**

Although this research offers new insight and a novel investigation into how people shift their beliefs about capital punishment, it is not without limitations. One limitation is that it is difficult to determine how effective each intervention was from Study 1, since we did not have a pure control. We also do not know whether our interventions from Studies 1 and 4 produced long-term belief revision as we did not collect additional post-test responses later on. Additionally, our specific victim blame measure in Study 4 was affected by condition which prevented us from interpreting those particular results. Furthermore, most of this research was exploratory in nature and therefore we would need to collect additional data and effectively replicate our findings in order to establish our results—particularly for the pattern of results we observed in participants' innocence estimates and subjective error rates in Study 4.

### **Conclusion**

This research highlights the need to understand the multitude of beliefs that underly people's conceptions of the death penalty, an immensely complex topic from both a moral and policymaking perspective. Indeed, by understanding these beliefs and their structure, we can better develop educational interventions to correct misconceptions where they arise and understand the broad set of motives that drive people's endorsement of the death penalty. Altogether, these findings highlight new avenues by which researchers can correct and shift people's attitudes about the death penalty.

## References

- Baldus, D. C., Woodworth, G., Zuckerman, D., & Weiner, N. A. (1997). Racial discrimination and the death penalty in the post-Furman era: An empirical and legal overview with recent findings from Philadelphia. *Cornell L. Rev.*, 83, 1638.
- Bates, D., Mächler, M., Bolker, B., & Walker, S. (2015). Fitting linear mixed-effects models using lme4. *Journal of Statistical Software*, 67(1), 1-48.
- Bohm, R. M., Clark, L. J., & Aveni, A. F. (1990). The influence of knowledge on reasons for death penalty opinions: An experimental test. *Justice Quarterly*, 7(1), 175-188.
- Bohm, R. M., Clark, L. J., & Aveni, A. F. (1991). Knowledge and death penalty opinion: A test of the Marshall hypotheses. *Journal of Research in Crime and Delinquency*, 28(3), 360-387.
- Bohm, R. M., & Vogel, B. L. (2004). More than ten years after: The long-term stability of informed death penalty opinions. *Journal of Criminal Justice*, 32(4), 307-327.
- Brace, P., & Boyea, B. D. (2008). State public opinion, the death penalty, and the practice of electing judges. *American Journal of Political Science*, 52(2), 360-372.
- Brand, P. A., & Anastasio, P. A. (2006). Violence-related attitudes and beliefs: Scale construction and psychometrics. *Journal of Interpersonal Violence*, 21(7), 856-868.
- Bürkner, P.C. (2018). Advanced Bayesian Multilevel Modeling with the R Package brms. *The R Journal* 10(1), 395-411.
- Campbell, R., & Kumar, V. (2012). Moral reasoning on the ground. *Ethics*, 122(2), 273-312.
- Carlsmith, K. M., Darley, J. M., & Robinson, P. H. (2002). Why do we punish? Deterrence and just deserts as motives for punishment. *Journal of personality and social psychology*, 83(2), 284.
- Cochran, J. K., & Chamlin, M. B. (2005). Can information change public opinion? Another test of the Marshall hypotheses. *Journal of Criminal Justice*, 33(6), 573-584.
- Cowan, C. L., Thompson, W. C., & Ellsworth, P. C. (1984). The effects of death qualification on jurors' predisposition to convict and on the quality of deliberation. *Law and Human Behavior*, 8(1-2), 53-79.



- Dancy, J. (1984). On Coherence Theories of Justification: Can an Empiricist Be a Coherentist? *American Philosophical Quarterly*, 21(4), 359-365.
- Death Penalty Information Center. (2018, February, 23). *Facts about the Death Penalty*. Retrieved from <https://deathpenaltyinfo.org/>
- Festinger, L. (1962). *A theory of cognitive dissonance* (Vol. 2). Stanford university press.
- Finckenauer, J. (1988). Public support for the death penalty: Retribution as just deserts or retribution as revenge? *Justice Quarterly*, 5(1), 81-100.
- Gawronski, B., & Bodenhausen, G. V. (2006). Associative and propositional processes in evaluation: An integrative review of implicit and explicit attitude change. *Psychological Bulletin*, 132(5), 692-731.
- Gelman, A., & Carlin, J. (2014). Beyond power calculations: Assessing type S (sign) and type M (magnitude) errors. *Perspectives on Psychological Science*, 9(6), 641-651.
- Gelman, A., Lee, D., & Guo, J. (2015). Stan: A probabilistic programming language for Bayesian inference and optimization. *Journal of Educational and Behavioral Statistics*.
- Gewirth, A. (1978). *Reason and morality*. Chicago, IL: University of Chicago Press.
- Gross, S. R., O'Brien, B., Hu, C., & Kennedy, E. H. (2014). Rate of false conviction of criminal defendants who are sentenced to death. *Proceedings of the National Academy of Sciences*, 111(20), 7230-7235.
- Hayes, R. M., Lorenz, K., & Bell, K. A. (2013). Victim blaming others: Rape myth acceptance and the just world belief. *Feminist Criminology*, 8(3), 202-220.
- Hoffrage, U., Lindsey, S., Hertwig, R., & Gigerenzer, G. (2000). Communicating statistical information. *Science*, 290(5500), 2261-2.
- Holyoak, K. J., & Powell, D. (2016). Deontological coherence: A framework for commonsense moral reasoning. *Psychological Bulletin*, 142(11), 1179.
- Holyoak, K. J., & Simon, D. (1999). Bidirectional reasoning in decision making by constraint satisfaction. *Journal of Experimental Psychology: General*, 128(1), 3.
- Horne, Z., Powell, D., & Hummel, J. (2015). A single counterexample leads to moral belief revision. *Cognitive science*, 39(8), 1950-1964.

- Horne, Z., Powell, D., Hummel, J. E., & Holyoak, K. J. (2015). Countering antivaccination attitudes. *Proceedings of the National Academy of Sciences*, *112*(33), 10321-10324.
- Hykel Cuddy, R. (2011). The Alford plea: Guilty but innocent. Retrieved from <https://www.legalzoom.com/>
- Janis, I. L., & King, B. T. (1954). The influence of role playing on opinion change. *The Journal of Abnormal and Social Psychology*, *49*(2), 211-218.
- Janoff-Bulman, R., Timko, C., & Carli, L. L. (1985). Cognitive biases in blaming the victim. *Journal of Experimental Social Psychology*, *21*(2), 161-177.
- Jiang, S., Lambert, E. G., Wang, J., Saito, T., & Pilot, R. (2010). Death penalty views in China, Japan and the US: An empirical comparison. *Journal of Criminal Justice*, *38*(5), 862-869.
- Johnson, K. (2018, October 11). Washington state supreme court deems death penalty unconstitutional. *The New York Times*. Retrieved from <https://www.nytimes.com/>
- Jones, J. M. (2017, October 26). U.S. Death Penalty Support Lowest Since 1972. *Gallup Poll*. Retrieved from <http://news.gallup.com/poll/221030/death-penalty-support-lowest-1972.aspx>
- Judd, C. M., Westfall, J., & Kenny, D. A. (2012). Treating stimuli as a random factor in social psychology: A new and comprehensive solution to a pervasive but largely ignored problem. *Journal of Personality and Social Psychology*, *103*(1), 54-69.
- Lambert, E. G., Camp, S. D., Clarke, A., & Jiang, S. (2011). The impact of information on death penalty support, revisited. *Crime & Delinquency*, *57*(4), 572-599.
- Lerner, M. J. (1980). The belief in a just world. In *The Belief in a just World* (pp. 9-30). Springer, Boston, MA.
- Lerner, M. J., & Miller, D. T. (1978). Just world research and the attribution process: Looking back and ahead. *Psychological bulletin*, *85*(5), 1030.
- Lewandowsky, S., Ecker, U. K., Seifert, C. M., Schwarz, N., & Cook, J. (2012). Misinformation and its correction: Continued influence and successful debiasing. *Psychological Science in the Public Interest*, *13*(3), 106-131.
- Lewandowsky, S., Gignac, G. E., & Vaughan, S. (2013). The pivotal role of perceived scientific consensus in acceptance of science. *Nature Climate Change*, *3*(4), 399-404.

- Liddell, T.M., & Kruschke, J.K. (2018). Analyzing ordinal data with metric models: What could possibly go wrong? *Journal of Experimental Social Psychology*, 79, 328-348.
- Lipkus, I. M., Samsa, G., & Rimer, B. K. (2001). General Performance on a Numeracy Scale among Highly Educated Samples. *Medical Decision Making*, 21(1), 37–44.
- Lord, C. G., Ross, L., & Lepper, M. R. (1979). Biased assimilation and attitude polarization: The effects of prior theories on subsequently considered evidence. *Journal of personality and social psychology*, 37(11), 2098.
- Lyons, D. (1965). *Forms and limits of utilitarianism*. Oxford, England: Clarendon Press.
- MacIntyre, A. (2007). *After virtue: A study in moral theory* (3rd ed.). Notre Dame, IN: University of Notre Dame Press.
- Manski, C., & Pepper, J. (2013). Deterrence and the Death Penalty: Partial Identification Analysis Using Repeated Cross Sections. *Journal of Quantitative Criminology*, 29(1), 123-141.
- McElreath, R. (2016). *Statistical Rethinking: A Bayesian Course with Examples in R and Stan*. Chapman & Hall/CRC Press.
- Michael, M. A. (1992). Utilitarianism and retributivism: What's the difference?. *American Philosophical Quarterly*, 29(2), 173-182.
- Nyhan, B. & Reifler, J. (2018). The roles of information deficits and identity threat in the prevalence of misperceptions. *Journal of Elections, Public Opinion and Parties*, 1-23.
- O'Neil, K. M., Patry, M. W., & Penrod, S. D. (2004). Exploring the effects of attitudes toward the death penalty on capital sentencing verdicts. *Psychology, Public Policy, and Law*, 10(4), 443-470.
- Powell, D. & Horne, Z. (Submitted). Expectations bias moral evaluations.
- Powell, D., Weisman, K., & Markman, E. M. (2018). Articulating lay theories through graphical models: A study of attitudes surrounding vaccination decisions. In T.T. Rogers, M. Rau, X. Zhu, & C. W. Kalish (Eds.), *Proceedings of the 40th Annual Conference of the Cognitive Science Society* (pp. 906-911). Austin, TX: Cognitive Science Society.
- Radelet, M. L., & Borg, M. J. (2000). The changing nature of death penalty debates. *Annual Review of Sociology*, 26(1), 43-61.

- Rawls, J. (1980). Kantian constructivism in moral theory. *The journal of philosophy*, 77(9), 515-572.
- Roberts, J., & Stalans, L. (2018). *Public opinion, crime, and criminal justice*. New York, NY: Routledge. (Original work published 1997)
- Rouder, J. N. (2014). Optional stopping: No problem for bayesians. *Psychonomic Bulletin & Review*, 21(2), 301-308.
- Sarat, A., & Vidmar, N. (1976). Public opinion, the death penalty, and the Eighth Amendment: Testing the Marshall hypothesis. *Wis. L. Rev.*, 171.
- Sen, A., & Williams, B. (Eds.). (1982). *Utilitarianism and beyond*. Cambridge, England: Cambridge University Press.
- Thaler, R. H., & Sunstein, C. R. (2008). *Nudge: Improving decisions about health, wealth, and happiness*. New Haven, CT: Yale University Press.
- Vidmar, N., & Ellsworth, P. (1974). Public Opinion and the Death Penalty. *Stanford Law Review*, 26(6), 1245-1270.
- Weiner, B., Graham, S., & Reyna, C. (1997). An attributional examination of retributive versus utilitarian philosophies of punishment. *Social Justice Research*, 10(4), 431-452.