UC Irvine
UC Irvine Electronic Theses and Dissertations

Title
What's Wrong is Wrisky: Moral Intuitions Bias Risk Perception

Permalink
https://escholarship.org/uc/item/4wm9b2b2

Author
Relihan-Johnson, Daniel

Publication Date
2018

Copyright Information

Peer reviewed|Thesis/dissertation

UNIVERSITY OF CALIFORNIA,
IRVINE

What's Wrong is Wrisky: Moral Intuitions Bias Risk Perception

THESIS

submitted in partial satisfaction of the requirements
for the degree of

MASTER OF ARTS

in Social Ecology

by

Daniel Relihan-Johnson

Thesis Committee:
Professor Peter H. Ditto, Chair
Professor Roxane Cohen Silver
Assistant Professor Paul K. Piff

2018

DEDICATION

To

my parents Jane A. Relihan and Thomas P. Johnson

for their extraordinary love, dedication, and support.

We need more understanding of human nature,
because the only real danger that exists is man himself
We know nothing of man, far too little.
His psyche should be studied because we are the origin
of all coming evil.

Carl Jung
1959

TABLE OF CONTENTS

Page

LIST OF FIGURES

Page

LIST OF TABLES

ACKNOWLEDGMENTS

I would like to express the deepest appreciation to my committee chair and primary advisor, Professor Peter H. Ditto, who provided invaluable guidance and feedback on my research and writing.

I would also like to thank my second advisor and reader of this thesis Professor Roxane Cohen Silver for her feedback and for teaching me the importance of methodological rigor and detail.

I additionally would like to thank the third reader of this thesis Assistant Professor Paul K. Piff for his valuable feedback on my research, writing, and presentations.

Lastly, I must express my profound gratitude to my parents and to my partner for providing me with unfailing support and continuous encouragement throughout my years of study and through the process of researching and writing this thesis. This accomplishment would not have been possible without them. Thank you.

ABSTRACT OF THE THESIS

What's Wrong is Wrisky: Moral Intuitions Bias Risk Perception

By

Daniel Relihan-Johnson

Master of Arts in Social Ecology

University of California, Irvine, 2018

Professor Peter H. Ditto, Chair

While risk is a factual probability that can be calculated rationally, intuitive and affective motivations can bias risk information processing. Furthermore, research on moral coherence illustrates that factual beliefs of the world often falls in line with one's moral intuitions. Research has yet to explore whether and how perceptions of risk morally cohere. I investigated how moral judgments influence perceptions of risk, such that people conflate what is morally wrong with what is risky. Study 1 examined morality and risk judgments of political threats and found that greater moral condemnation of each threat was associated with higher perceived likelihood of related physical harm. Based on prior research indicating that intention behind an action is an important component of how the action is judged morally (e.g., manslaughter versus murder), Study 2 manipulated moral judgments by varying the intentions of actions and found that participants judged intentional actions as more immoral and riskier than the same actions unintentionally committed. Study 3 further investigated the role of intention by manipulating actions to have good, ambiguous, or bad intentions, and found that, overall, bad intentioned actions were seen as more immoral and riskier than the same actions with good or ambiguous intentions, whereas good and ambiguous intentioned actions tended not to differ in moral and

risk judgments. Results provide initial evidence that moral judgments influence risk perception, such that perceptions of threat cohere along moral lines. These findings have implications for understanding risk assessment in political, legal, law enforcement, medical, and military contexts.

INTRODUCTION

Risk assessment is a process encountered multiple times a day, whether one is, for instance, driving in poor weather conditions, deciding if food is still good to eat, or choosing in which stocks to invest. The ubiquity of everyday risk management can even be seen in colloquial maxims, such as "it's better to be safe than sorry". However, although danger is real, risk assessment is inherently subjective and often socially constructed, For example, Americans are far more likely to die from transportation accidents (e.g., National Safety Council, 2018) than be murdered by an illegal immigrant (e.g., Nowrasteh, 2016), yet the 2018 Republican-led U.S. government proposed decreasing the budget for the Department of Transportation by about $2.4 billion and increasing funding for a new wall along the Mexican border by $2.6 billion (Soffen & Lu, 2017). This shift in resource allocation followed a rise in populism within the Republican Party during the 2016 presidential election, which was characterized by a wave of anti-immigration sentiment (Oliver & Rahn, 2016; Zakaria, 2016). Thus by elevating the threat status of illegal immigrants, Republicans were able to justify spending additional valuable resources on a lower level threat while reducing resources for a department that works to mitigate risks of a more probable threat.

A second example can be found in state legislature proposed to limit transgendered individuals to using bathrooms of their biological sex. Republican partisans who supported these measures commonly argued that allowing transgendered women to use women's restrooms would permit greater access for male sexual predators into female spaces (Steinmetz, 2015). Such arguments are reminiscent of when gay men were commonly stereotyped as being more likely to sexually prey on children (e.g., Lee, 2008), and are consistent with research correlating religiosity and conservatism with greater disgust and moral disapproval for sexual deviancy

(Brown & Henriquez, 2008; Crawford, Inbar, & Maloney, 2014; Lottes & Kuriloff, 1992; Herek, 1988; Olatunji, 2008; Rosik, Dinges, & Saavedra, 2013; Shakelford & Besser, 2007; Whitley & Lee, 2000). Still, the adoption of the anti-trans bathroom bill led to greater costs than benefits. For instance, after passing state measure HB2 in North Carolina, the state tallied losses of over $5 billion and 1,800 jobs due to decreased federal funding, business investment, and tourism, and increased litigation and enforcement costs (Mallory & Sears, 2016). Thus, enacting affective and morally motivated policies due to increased threat perception resulted in greater economic losses than any gains in actual security and safety.

Although such bias in threat perception is not solely limited to Republican partisans, these two examples illuminate how motivated reasoning in risk assessment can lead to detrimental policy and economic decisions. Although decades of research show that affect often drives risk perception (e.g., Alhakami & Slovic, 1994; Finucane, Alhakami, Slovic, & Johnson, 2000; Fischoff, Slovic, Lichtenstein, Read, & Combs, 1978; Slovic, Finucane, Peters, & MacGregor, 2007; Slovic & Vastfjall, 2010), less is known about the role of morality. Given that moral reasoning relies on similar information processing as affect, the question remains as to whether moral judgments also drive perceptions of risk. To fill this gap in the literature, the present research aimed to better understand the correlational and causal relationship between moral judgments and risk perception. Investigating the relationship between morality and risk has important implications for potential under- and over-estimating risk across a variety of contexts, such as in political, legal, law enforcement, and military decision making.

Information processing

Mechanisms of judgment and decision-making are typically conceptualized through dual-process models, which describe information processes of memory and attention as having both a

non-conscious, automatic mode (type 1 process), and a conscious, controlled mode (type 2 process; Schneider & Shiffrin, 1977; Shiffrin & Schneider, 1977). Early dual-process models, such as the heuristic-systematic model, primarily focused on the cognitive nature of information processing (Fiske & Taylor, 2013). For example, heuristic processing entails the use of heuristics (i.e., 'mental shortcuts' or judgment rules) that require minimal cognitive demands for a perceiver to process judgment-relevant cues. Although reliance on heuristics may be beneficial in that they require less cognitive resources and allow faster, simpler decision-making, they also lead to systematic and predictable errors (Chen & Chaiken, 1999). Indeed, Kahneman and Tversky famously demonstrated a number of heuristics people rely upon when making judgments under uncertain conditions that lead to erroneous conclusions (Kahneman & Tversky, 1972, 1973; Tversky & Kahneman, 1971, 1973, 1974), such as availability, representativeness, and anchoring and adjustment. In the context of risk perception, for instance, judgments about the probability of an event, such as the likelihood of a car accident, can be biased by the ease with which relevant events come to mind (i.e. availability; Tversky & Kahneman, 1973), as well as by how similar or dissimilar its characteristics are to its related broader category of events (i.e., representativeness; Kahneman & Tversky, 1972). However, despite the utility of early cognitive-focused process models such as the heuristic-systematic model and the elaboration likelihood model (ELM: Cacioppo & Petty, 1984), the role of affect and intuition in information processing was not fully addressed. As the field of psychology turned its focus to affective and intuitive motivations (i.e., the "affective revolution"), dual-process models were expanded (e.g., Epstein, 1994; Zajonc, 1980), allowing for an explanation of the underlying mechanisms behind motivated reasoning- a general trend for both conscious and nonconscious motivations to influence reasoning through cognitive and affective processes (Kunda, 1990; Lodge & Taber,

2005; Redlawski, 2002; Taber, Lodge, & Glathar, 2001; Taber, Cann, & Kucsova, 2009). Now called a variety of different names, including intuitive/analytic, implicit/explicit, emotional/intellectual, experiential/rational, hot/cold, type1/type2, and system1/system2, these two modal processes can interact and overlap, though they are distinct types of processing both psychologically (Epstein, 1994; Evans, 2003; Evans & Stanovich, 2013; Kuhn, 2013; Stanovich & West, 2000; cf. Gigerenzer, 2011; Keren & Shul, 2009; Kruglanski & Gigerenzer, 2011; Osman, 2004) and physiologically (Masicampo & Baumeister, 2008; Smith & DeCoster, 2000).

In dual-process models, Type 1 processing is characteristically defined as intuitive and autonomous (i.e., does not require working memory), though it is also often associated with processing that is fast, nonconscious, biased, contextualized, associative, emotional, and independent of cognitive ability (Evans & Stanovich, 2013). Type 1 processing is hypothesized to be older evolutionarily, enabling humans to use emotion and intuition as information for making snap judgments in uncertain and adverse environments, which may provide accurate, though also inaccurate, bases for decision-making (Damasio, 1994; Schwarz & Clore, 2007). For example, intuition, instinct, and gut feelings were likely relied upon to determine whether an animal was safe to approach, or if water was safe to drink (Evans, 2003; Slovic & Vastfjall, 2010). Such reliance on intuition and emotion for decision making has been conceptualized a number of different ways, include the feelings-as-information hypothesis (Clore, Schwarz, & Conway, 1994; Frijda, 1988; Greifendeder, Bless, & Pham, 2011; Schwarz & Clore, 1996; Zajonc, 1980), affective rationality (Slovic, Finucane, Peters, & MacGregor, 2002), intuitive hunch (Topolinski & Strack, 2009), gut feelings (Liebermann, 2000), emotion-based intuition (Bolte, Goschke, & Kuhl, 2003), and the affect heuristic (Finucane et al., 2000; Slovic et al., 2007; Slovic, Finucane, Peters, & MacGregor, 2002; Slovic & Vastfjall, 2010). As life became

more complex throughout evolutionary development, humans increasingly gained control over their environment and mental analytic tools, such as logic and math, developed to boost the rationality of experiential thinking. This Type 2 processing is characterized by reflective and deliberative thinking (i.e., requires working memory), cognitive decoupling, and mental simulation. Type 2 processing is also characterized as slower, limited in capacity, conscious, abstract, controlled, rule-based, and reliant on cognitive ability (Evans, 2003; Evans & Stanovich, 2013; Slovic & Vastfjall, 2010). The activation structure of these two processes remains under debate. For instance, parallel-competitive theories posit that both processes activate in parallel and each is implicated in processed information (Sloman, 1996; Barbey & Sloman, 2007). Default-interventionist theories, on the other hand, assume that fast Type 1 processing is an intuitive default process upon which the reflective Type 2 process may or may not intervene (Evans & Stanovich, 2013). Irrespective of their order of activation, the reviewed theoretical and empirical research suggests that information processed in judgment and decision-making may incorporate motivating factors, such as emotion and intuition. Although these motivations may be beneficial in some contexts of survival, they also allow for the possibility of erroneous judgments.

Motivated reasoning

Despite motivations to be accurate in decision making (Lerner & Tetlock, 1999), affect, emotion, and intuition from Type 1 processing can bias people's preferences for specific judgment conclusions (Kunda, 1990; Westen, Blagov, Harenski, Kilts, & Hamann, 2007). For example, people tend to perceive positive information about themselves as more valid than negative information about themselves (Ditto & Lopez, 1992; Ditto, Scepansky, Munro, Apanovitch, & Lockhart, 1998; Wyer & Frey, 1983); and this extends to social attitudes where

5

evidence that supports one's closely held attitudes and beliefs are more sought out, more

favorably interpreted, found more compelling, and considered more valid than evidence

challenging such beliefs and attitudes (e.g., confirmation bias; Ditto, Pizarro, & Tannenbaum,

2009; Jonas, Schulz-Hardt, Frey, & Thelen, 2001; Lord, Ross, & Lepper, 1979; MacCoun, 1998;

Munro & Ditto, 1997; Mynatt, Dohert, & Tweney, 1977; Nickerson, 1998). The mechanism

through which one judgment conclusion may become preferred over another is by the association

of judgment target characteristics with one's affect response to the target. The *hot cognition*

hypothesis, for instance, suggests that all sociopolitical concepts, such as people, groups, issues,

and symbols, are affiliated with specific emotions (Lodge & Taber, 2005). This concept-emotion

relationship becomes encoded in long-term memory, influencing subsequent evaluations and

decisions (Abelson, Kinder, Peters, & Fiske, 1982; Ditto & Lopez, 1992; Lodge & Taber, 2005;

Rudolph, 2006), such as by seeking out and supporting one's desired conclusions (Kunda, 1990).

One type of motivated reasoning for which this can be found is moral reasoning, where moral

judgments may be motivated by affect (Haidt, 2001) and moral principles are used to rationalize

preferred moral conclusions (Uhlmann, Pizarro, Tannenbaum, & Ditto, 2009). Hence, moral

reasoning implicates Type 1 processing by relying on affect and intuition, which can lead to

biased judgment outcomes.

Moral intuitions

Moral reasoning is theorized to have evolved to deal with the challenges of group living

in increasingly complex social environments (Ditto, Pizarro, & Tannenbaum, 2009; Fehr &

Gachter, 2000; Gintis, Bowles, Boyd, & Fehr, 2005; Haidt, 2001; Haidt & Graham, 2007) and

appears to occur in a dual-process fashion. For instance, the social intuitionist approach posits

that moral judgments rely on quick 'gut feeling' intuitions that are not always consciously

accessible (i.e., Type 1 processing; Haidt, 2001). This approach was expanded upon by Moral Foundations Theory (MFT), which has evidenced several innate and universally available psychological systems comprising the foundation of how people feel ethically, including *harm-care*, *fairness-cheating*, *loyalty-betrayal*, *authority-subversion*, and *sanctity-purity* (Haidt, 2012; Haidt & Graham, 2007; Haidt & Joseph, 2007). Unique versions of morality are then created, differing within and between nations, by cultures constructing virtues and narratives atop these foundations (Graham, Haidt, Koleva, Motyl, Iyer, Wojcik, & Ditto, 2012; Graham, Haidt, & Nosek, 2009). For example, the MFT framework has aided in explaining differences in political values and perceptions: while liberals tend to show greater endorsement of foundations related to individual rights and autonomy, conservatives tend to endorse all five foundations equally (Graham, Haidt, & Nosek, 2009; Haidt & Graham, 2007), and framing moral issues in terms of the five foundations influences political attitudes (Day, Fiske, Downing, & Trail, 2014). The notion that moral judgments rely on intuitive gut-feeling foundations, and that political differences can be explained by differences in these intuitive gut-feelings, provides an explanation for the current increasingly extreme political climate in the U.S., whereby the inability to feel, rather than think, from others' perspectives appears to be creating a red-blue *moral empathy gap* (Ditto & Koleva, 2011).

Moral coherence

Differences in how people morally feel can lead to divergences in how they reason about facts. For instance, there are two forms of moral reasoning through which an act's morality is determined. While consequentialist reasoning tends to be more economically rational and emphasizes that an act is moral to the extent that it maximizes positive consequences (i.e., ends justify means), deontological reasoning centers on duties, or morally mandated sacred values,

7

that are considered absolute and ought to be protected from cost-benefit assessments (i.e., ends do not justify some means; Baron & Spranca, 1997; Liu & Ditto, 2012; Tetlock, 2003). Both types of reasoning may be used to maintain consistent perceptions of the world. Indeed, humans are inherently motivated to perceive their social worlds in a simple, organized, coherent manner (Bem, 1972; Festinger, 1947; Steele, 1988) and, in doing so, strive to reach a maximal internal consistency, or 'coherence', among their beliefs, feelings, preferences, goals, and actions (Simon, Krawczyk, & Holyoak, 2004; Thagard, 2002). This can be rationally achieved when making sense of information by adjusting conclusions to fit with factual knowledge, but also less rationally achieved by adjusting facts to fit with conclusions. Motivation to reach coherence in the moral domain is known as *moral coherence*, where people look to construct coherent, emotionally satisfying views of the world by bringing their descriptive understanding of it in line with their prescriptive frame of reference (Clark, Chen, & Ditto, 2015). In other words, when motivated to resolve the dissonance of a moral dilemma, factual information, such as an action's costs and benefits, may be shaped in a post hoc reasoning process that conforms to deontological reasoning.

This notion was supported in a series of studies by Liu and Ditto (2012). A classic social psychology paradigm is the footbridge moral dilemma, where a hypothetical group of workmen are stuck on a trolley track and can be saved by a runaway trolley if a large man standing on a bridge over the tracks is pushed off into the way of the train. This dilemma pits consequentialist reasoning, or sacrificing the life of one man to save several others, against deontological reasoning, which argues that it is wrong to sacrifice one life even if it saves many others. Liu and Ditto (2012) found in one study that participants who relied on deontological moral reasoning to solve the footbridge dilemma also saw the act of pushing the man off the bridge as less likely to

8

actually save the lives of the others, suggesting that how they morally reasoned about the action was related to their perceptions of the action's effectiveness. The researchers replicated this finding using real-world moral dilemmas about forceful interrogations, condom protection, capital punishment, and stem cell research, and found that this relationship was stronger for participants with greater moral conviction about the issue, participants who felt more informed about the issue, and for political conservatives. Lastly, the researchers manipulated moral judgments by assigning participants to read persuasive deontological arguments either for or against the death penalty and found that not only did this produce changes in moral judgments of capital punishment, but also changed beliefs about its effectiveness. Participants who read anti-capital punishment essays judged the death penalty as more deontologically immoral and expressed weaker beliefs in its ability to deter future crime, compared to the pro-capital punishment essay condition. The results of these studies suggest that descriptive knowledge, such as facts about costs and benefits, may be driven by motivation to see things in a morally coherent way. To extend this work, the present studies investigated the effect of moral judgments on a common type of cost-benefit fact that is frequently assessed across a number of contexts: the probability of a harmful outcome, or risk.

Risk

Subjective perceptions of risk often diverge from objective levels of danger. Traditional views conceptualized risk assessment as the objective quantification of probabilities and consequences of adverse events caused by physical and natural forces, whereby people rationally weigh costs and benefits in an analytical fashion (e.g., Mosteller & Nogee, 1951). More recent views define risk assessment as an inherently subjective process created to help humans manage danger and uncertainty (Slovic, 1999). For instance, there are a number of factors associated with

perceived risk such as race and sex (Finucane, Slovic, Mertz, Flynn, & Satterfield, 2000; Flynn,

Slovic, & Mertz, 1994; Gustafsod, 1998; Kahan, Braman, Gastil, Slovic, & Mertz, 2007;Slovic,

1999), social class (Anderson & Galinsky, 2006; Dubois, Rucker, & Galinsky, 2015; Cote, 2011;

Griskevicius, Tybur, Delton, & Robertson, 2011; Kish-Gephart, 2017; Piff, Stancato, Côté,

Mendoza-Denton, & Keltner, D., 2012), beliefs about hazards, (Fischoff, 1983; Fischoff, Slovic,

& Lichtenstein, 1979, 1982; Slovic, 1987; Starr, 1969), prior experiences with negative life

events (Blum, Silver, & Poulin, 2014), how risk information is framed (Combs & Slovic, 1979),

numeracy (i.e., the ability to understand numbers; Peters, Hibbard, Slovic, & Dieckmann, 2007;

Peters, Vastfjall, Slovic, Mertz, Mazzocco, & Dickert, 2006) and affect (Finucane, Alhakami,

Slovic, & Johnson, 2000; Johnson & Tversky, 1983; Gray & Ropeik, 2002; Lerner, Gonzalez,

Small, & Fischoff, 2003; Lerner & Keltner, 2001; Slovic, 1987).

Although it may be socially desirable to think that one's risk calculations are based on

logic and reason, risk information tends to be processed using both system processes. *Risk as

feelings* is characterized by quick, intuitive reactions to danger, such as in experiential system 1

processing (Slovic & Vastfjall, 2010). For instance, Fischhoff, Slovic, Lichtenstein, Read, and

Combs (1978) showed that public perception and acceptance of risk for a variety of hazards were

associated with feelings of dread. A subsequent study by Alhakami and Slovic (1994) found that

perceived risks and benefits were linked to the strength of associated negative or positive affect,

implying that participants judged risk, at least in part, by how they felt about it. If participants'

feelings toward an act were favorable, they tended to perceive risk as low and benefits as high,

while feeling negative and unfavorably toward an act led to perceptions of higher risk and less

benefits, thus relying on the affective heuristic (Finucane et al., 2000; Slovic et al., 2007). *Risk

as logic, on the other hand, relies on reason and deliberation to assess risk, as with Type 2 processing (Slovic & Vastfjall, 2010).

A number of studies, including the ones just reviewed, indicate that affect can bias risk information processing. However, less is known about the extent to which morality might also influence perceptions of risk and threat. Initial work looking at how values shape factual beliefs showed that values of individualism versus egalitarianism are associated with risk-related beliefs (Braman & Kahan, 2006; Kahan, 2012; Kahan & Braman, 2006; Kahan, Braman, Gastil, Slovic, & Mertz, 2007; Kahan, Braman, Slovic, Gastil, & Cohen, 2007, 2009; Kahan, Jenkins-Smith, & Braman, 2011; Kahan, Wittlin, Peters, Slovic, Ouelette, Braman, & Mandel, 2011). Studies by Liu and Ditto (2012) expanded this work by looking at the value-factual belief relationship in the context of moral dilemmas. The researchers found significant associations between descriptive cost-benefit beliefs and prescriptive moral opinions related to, and that this descriptive-prescriptive relationship was stronger with greater political conservatism and moral conviction. Additionally, they found that reading essays about the inherent morality or immorality of capital punishment influenced participants' beliefs about its ability to effectively deter crime. Taken together, the reviewed evidence suggests that moral judgments may be expected to drive perceptions of risk.

Present Studies

To build on this previous work, the present studies aimed to test the relationship between moral judgments and risk perception. I first sought to establish that there is a significant relationship between moral judgments and perceived risk, and began by investigating this relationship in a political context. Next, I looked to establish a causal relationship – that moral judgments drive risk perception, beginning outside of a political context. Drawing on prior

research findings indicating that actions that are attributed with more intention (e.g., Cushman, 2008; Malle, 2006) and potential for harm (e.g., Gino, Shu, & Bazerman, 2010) lead to more harsh moral judgments (Ditto, Liu, & Wojcik, 2012), I manipulated moral judgments by varying the intentions behind actions where participants provided moral judgments of the same actions that were either unintentionally or intentionally committed. To further understand the extent to which intention drives moral judgments and perceived risk of an action, I then manipulated actions to have either good, ambiguous, or bad intentions. Thus, I had three hypotheses in the present studies:

H1: *Moral judgments will be significantly associated with risk perceptions, such that the more immoral something is judged, the more risky it will be perceived.*

H2: Actions committed intentionally will be judged more immoral and riskier than the same actions committed unintentionally.

H3: Actions committed with bad intentions will be seen as more immoral and riskier compared to the same actions committed with good or ambiguous intentions, while good intentioned actions may or may not be seen as less risky than if they were done with ambiguous intentions.

STUDY 1

Study 1 investigated whether there is a significant relation between moral judgments and perceived risk in a political context. I hypothesized that there would be a significant correlation between moral judgments and risk estimates for each of ten political threats.

Method

Participants. Two-hundred and eighty-one southern California undergraduates were recruited for an online survey in exchange for course extra credit. Four participants were

excluded from analyses, three due to providing no responses to the survey items, and one for failing an attention check[1] ($M_{Duration}$ = 1182s, $SD_{Duration}$ = 833.50s), leaving a final sample of 277 (176 female; 82.54% 18-21 years old).

Materials. Participants were presented with 10 political threats, one at a time, and in randomized order. To survey responses to a range of threats across the political spectrum, the political threats were created such that five were hypothesized to be found more immoral and threatening to conservatives (*decision to end a pregnancy*, *restrictive gun laws*, *safe homosexual sex*, *crossing your country's border illegally*, and *legalizing recreational marijuana*), and five were hypothesized to be found more immoral and threatening by liberals (*unlimited campaign contributions*, *nuclear energy*, *genetically modified food (GMOs)*, and *using oil and coal for energy*),with moderates fluctuating in-between. For each threat, participants provided moral judgments and risk estimates.[2]

Moral Judgment. Participants rated the extent to which they found each threat justified or unjustified from 1(*never justified*) to 7(*always justified*) and moral or immoral from 1(*very immoral*) to 7 (*very moral*). Combining these two items for each threat showed moderate to excellent reliability, α_{Range} = .65-.93, α_{Mean} = .78. Since averaging moral judgments across all ten threats for an overall moral judgment score did not have good reliability, α = .47, moral judgments for each threat were analyzed both separately and in aggregate.

Risk Estimates.

---

[1] An attention check item was randomly included in each survey, asking participants to "please choose response option number three".

[2] Participants also self-reported how they feel about each threat using a 7-point scale for six basic emotions, including anger, happiness, sadness, disgust, fear, and surprise, from 1(*strongly disagree*) to 7(*strongly agree*). Results from this measure are not reported here, but may be used for future direction analyses.

Physical risk. The main dependent variable of interest was physical risk estimates, as these are technically calculable probabilities that are often represented numerically, such as in odds or percentages. Participants estimated the likelihood of a negative physical outcome related to each threat by using a slider bar from 0% (*not likely at all*) to 100% (*completely likely*) anchored at zero. These estimates measured general perceptions about physical risks specific to each threat. For example, the physical risk question for decision to end a pregnancy asked, "*What is the likelihood that a woman who decides to end her pregnancy will have subsequent mental or physical health issues from it?*", and the physical risk question for genetically modified food asked, *"What is the likelihood that consuming genetically modified food can cause physical health issues?"* Hence, the physical risk questions were about people more generally, as opposed to a specific target e.g., the participant, an American, a hypothetical person), and sought to assess a broad perception of the likelihood of physical harm, related to each threat.

For two threats, legalizing recreational marijuana and oil and coal energy use, two questions were asked to assess separate, but related types of physical risks. For example, the physical risk estimates for legalizing recreational marijuana comprised of the likelihood of physical harm to the smoker, and the likelihood that its use would lead to an increase in use of other drugs. These two items were combined for this threat's physical risk estimate, $\alpha = .81$. The physical risk estimates for oil and coal energy use were meant to measure broader physical risk assessment of climate change, which was the average of the likelihood that using oil and coal for energy can lead to global climate change, and the likelihood that global climate change can impact health, $\alpha = .76$. All other threats had single physical risk estimates (see Appendix for full list of materials). Since averaging physical risk estimates across all ten threats did not have good

14

reliability, $\alpha = .37$, physical risk estimates for each threat were analyzed both separately and in aggregate.

　　Social risk. Though not a calculable probability, social risk, or potential for social harm, may also be related to moral judgments. As an exploratory measure, participants also estimated the likelihood of a negative social outcome related to each threat by using a slider bar from 0% (*not likely at all*) to 100% (*completely likely*) anchored at zero. The social risk questions measured general perceptions about social risks specific to each threat. Each threat's social risk question started with, *"What is the likelihood of being negatively evaluated by others for…"*, and had an ending specific to the threat. For instance, the social risk question for decision to end a pregnancy asked, *"What is the likelihood of being negatively evaluated by others for deciding to end a pregnancy?"*, and the social risk question for genetically modified food asked, *"What is the likelihood of being negatively evaluated by others for supporting genetically modified food?"* Hence, the social risk questions were about people more generally, and sought to assess a broad perception of the likelihood of social harm related to each threat. There was only one social risk question per political threat, and even though averaging social risk estimates across all ten threats had moderate reliability, $\alpha = .68$, social risk estimates for each threat were analyzed separately.

　　Demographics. Lastly, participants completed several demographic questions including Income was measured in bins of $20,000 from *$0* to *$120,000 or higher*. Social and economic political orientations were measured on a 7-point scale from 1(*very conservative*) to 7(*very liberal*). These two variables were reverse coded such that higher scores indicate greater conservatism. They were then averaged into political orientation composite, $\alpha = .73$. To check that the stimuli were perceived difference by political partisans in morality and risk estimates, the political orientation composite variable was categorized such that scores below four were

grouped as liberals, scores equal to four were grouped as moderates, and score above four were grouped as conservatives. Religiosity was measured using one item that asked, "To what extent do you consider yourself religious?" and belief in god was measured using one item that asked, "To what extent do you believe in a god or gods?", with responses to both being from 1(*not at all*) to 7(*completely*). Participants also indicated their sex, ethnicity, political party affiliation, religious affiliation, and average daily number of hours spent using traditional (e.g., TV, radio) and social media. Age was used from a subject pool pre-screening battery completed before participating in the study (see Appendix for full demographic information).

Results[3]

Stimulus check. Study 1 aimed to establish a significant relationship between moral judgments and risk perception. Descriptive statistics for political partisan moral judgments and risk estimates are presented in *Table 1*. With the exception of genetically modified food, moral judgments were in the hypothesized political partisan directions such that conservatives judged the five conservative threats more immoral than liberals, and liberals judged the liberal threats more immoral conservatives. Physical risk estimates were also in the expected directions, except for genetically modified food and American military operations overseas. Social risk estimates were generally mixed and did not appear in the expected political directions.

Risk. The main hypothesis for Study 1 was that that there would be a significant correlation between moral judgments and risk estimates among political threats. To test this, Pearson product-moment correlations were conducted between moral judgment and physical risk estimate for each political threat. Moral judgments and physical risk estimate descriptive statistics are summarized in *Table 2*. For each of the ten political threats, moral judgment

---

[3] R version 3.3.1 (R Core Team, 2016) was used for all statistical analysis in this and subsequent studies. R code and data files are available from the first author upon request.

significantly correlated with physical risk estimate: decision to end a pregnancy, $r(259) = .30$, p

$< .001$, 95%CI [.19,.41][4], restrictive gun laws, $r(261) = .56$, $p < .001$, 95%CI [.36,.55], safe

homosexual sex, $r(245) = .36$, $p < .001$, 95%CI [.24, .46], crossing your country's border

illegally, $r(253) = .41$, $p < .001$, 95%CI [.30,.51], legalizing recreational marijuana, $r(253) = .66$,

$p < .001$, 95%CI [.58,.73], unlimited political campaign contributions, $r(256) = .43$, $p < .001$,

95%CI [.32,.52], nuclear energy use, $r(264) = .60$, $p < .001$, 95%CI [.52,.67], genetically

modified food, $r(255) = .55$, $p < .001$, 95%CI [.46,.63], American military operations overseas,

$r(255) = .25$, $p < .001$, 95%CI [.13,.36], oil and coal use for energy, $r(250) = .31$, $p < .001$,

95%CI [.20, 42]. Taken together, these results support the hypothesis that moral judgment and

risk perception are significantly associated. As exploratory analyses, moral judgments were

correlated with social risk estimate for each threat using Pearson's product-moment correlations.

Results showed significant correlations for two of the threats, nuclear energy use, $r(252) = .47$, p

$< .001$, and genetically modified food, $r(237) = .27$, $p < .001$ (*Table 3*), while the other eight

threats had non-significant correlations between moral judgment and social risk estimate.

　　　To analyze the overall relationship between moral judgment and physical risk estimates,

scores for these two variables were collapsed across the ten political threats. A Pearson product-

moment correlation between overall mean moral judgment and mean physical risk estimate

indicated a significant association, $r(181) = 37$, $p < .001$, 95% CI[.24, .49] (*Figure 1*). To test

whether this relationship holds above and beyond factors that may be related to moral judgments

about political threats, an Ordinary Least Squares (OLS) regression was conducted predicting

overall physical risk estimate from moral judgment, controlling for gender, income, political

orientation, ethnicity, religiosity, belief in a god or gods, and media use[5]. The overall model was

---

[4] 95% confidence intervals are presented in brackets.
[5] All continuous variables were standardized in this and all subsequent regression analyses.

significantly different from zero, $R^2 = .24$, $F(12, 165) = 4.38$, $p < .001$, and supported the hypothesis that there is a significant relationship between moral judgment and risk estimate. Participants who judged the political threats as more immoral also estimated greater likelihood of related risk, $\beta = .33$, $t(165) = 4.39$, $p < .001$, 95%CI [.18,.48] (*Table 4*).

Discussion

Overall, results from Study 1 supported the hypothesis that moral judgments are significantly related to perceptions of risk. Across a range of different political threats, I found that the more participants judged the threat as immoral, the greater likelihood they estimated of a related negative outcome, and that this relationship held above and beyond factors related to morality and political threat perception. While there was strong evidence that this was the case for physical risk across the ten threats, there was weak evidence to support a significant association between moral judgments and social risk estimates. It is unclear why moral judgments might be related to physical but not social risk assessment. One possibility is the measure for assessing risk. For instance, physical risks are typically represented numerically, such as in odds and rates, while, social risks, such as the likelihood of being negatively judged by others, are not. By asking participants to estimate a risk in an unconventional way (i.e., social risk as a percent likelihood), the measure may have poor construct validity. A second and related possibility is that the physical risk questions were much more varied in wording and tailored to each threat specifically, while the social risk questions were more uniform across the threats. Hence, the lack of a correlation between moral judgment and social risk perception could be due to an issue with content validity. Follow-up studies will be necessary to further explore the morality of physical versus social risk perceptions and their measurements.

Study 1 had other limitations as well. For instance, the use of a college student sample mitigates the generalizability of the results, and results were only correlational. To investigate the causal relationship between morality and risk perception, and with a different sample, moral judgments were manipulated in Study 2 through an online data collection website. One way to manipulate moral judgments is to vary the mind perceived behind the judgment target. Conceptualized a number of different ways, including agency, intentionality, mentalizing, and perspective taking, the presence of a mind has repeatedly shown to be an important part of the degree to which people and actions are judged in moral terms (Carpendale & Chandler, 1996; Chandler, Sokol, & Hallett, 2001; Cushman, 2008; Knobe, 2005; Killen, Mulvey, Richardson, Jampol, & Woodward, 2011; Killen & Smetana, 2009; Leslie,k Knobe, et al., 2006; Moran, Young, Saxe, Lee, O'Young, Mavros, & Gabrieli, 2011; Yuill & Perner, 1988; Zelazo, Helwig, & Lau, 1996). It is intention, for example, that differentiates manslaughter from murder in the American justice system, where the latter is considered a morally worse crime and for which the punishment may be attenuated if the mind behind the action is found to be unstable. Indeed, actions that are attributed with more intention (e.g., Cushman, 2008; Malle, 2006) lead to more harsh moral judgments (Ditto et al., 2012).

Study 2

Study 2 aimed to test a causal relationship between moral judgments and risk perception. I hypothesized that manipulating an action to be done intentionally would lead to more moral condemnation and greater perceived risk related to the action compared to if it was done unintentionally, despite the effects of the action in both cases being the same. In other words, holding everything about an action constant (e.g., the actor, context, effect of the action) except the intention behind it, I anticipate people will find intentional actions more dangerous than if

they were unintentionally committed. The first was an indirect measure in which participants bet hypothetical money on the likelihood of a negative outcome related to each action. I hypothesized that the more immoral participants found the action to be, the more they would be willing to bet that a related negative outcome would occur. As in Study 1, risk was also assessed using a standard Likert scale.

Method

Participants. Four-hundred and seventeen participants were recruited from the U.S. through Amazon's Mechanical Turk (MTurk) in exchange for $1, and using MTurk Prime features to prevent repeat participation. Seven participants were excluded from analysis for not providing responses to any survey questions, leaving a final sample of 410 (237 female; $M_{Age} =$ 39.80, $SD_{Age} = 14.43$).

Materials. Participants were randomly assigned into one of two conditions. In the *unintentional condition* ($n = 207$), participants read three vignettes, each about a scenario in which an actor commits an action unintentionally. Participants in the *intentional condition* ($n = 203$), read the same three vignettes, except that the actions were intentionally committed. The following vignettes were presented in random order:

Flight vignette

> *Kevin is in Las Vegas for the weekend for his best friend's bachelor party. Scheduled to fly back home to his wife and kids on Sunday afternoon, Kevin leaves for the airport an hour and a half before his flight.*
>
> Unintentional condition: *However, on the way a car drives through a red light and hits his rental car, requiring him to file insurance and police reports to deal with the accident. His flight is domestic and on-time, he already checked in online, and he has*

only 1 carry-on bag. With 35 minutes until his flight departs, Kevin arrives at the airport.

Intentional condition: *However, on the way he decides to stop at a nearby casino for some last minute gambling. Losing track of time, he withdraws half of the funds from his kids' college tuition account and loses it all in a few rounds of roulette.*

Quarter vignette

Jason is at an amusement park and decides to go on the Freefall ride. Before he gets on, the staff ask all riders to remove loose items from their pockets.

Unintentional condition: *As the ride reaches the top, Jason doesn't realize he forgot to take a quarter out of his shirt pocket. The quarter flies out of his pocket as the ride drops.*

Intentional condition: *As the ride reaches the top, Jason realizes there is a quarter in his shirt pocket. Thinking it would be funny to hit someone in the head, he throws the quarter out of his pocket as the ride drops.*

Expired food vignette

Jasmine was invited to attend a company dinner party tonight with her co-workers and is running behind getting ready. Each employee was asked to bring their own dessert to share. After finding a recipe online, Jasmine decided to make a custard pie.

Unintentional condition: *While making the custard, she unknowingly used milk that is past its expiration date. She brings the pie with her and a few people eat it.*

Intentional condition: *While making the custard, she noticed that the milk she used is past its expiration date. Since she doesn't like her job and hates her co-workers, she brings the pie with her and does not tell anyone about the expired food. A few people eat it.*

Risk question: *What is the likelihood one of Jasmine's co-workers who at the pie will get sick from it?*

Moral Judgment. For each vignette, participants rated the extent to which the action was good or bad from 1(*very good*) to 7(*very bad*), justified or unjustified from 1(*completely justified*) to 7(*never justified*), and moral or immoral from 1(*very moral*) to 7(*very immoral*). Combining these three items for each of the vignettes showed good reliability, with Cronbach alpha coefficients ranging from .78 to .88. Averaging moral judgments across the three vignettes for each condition had good reliability for an overall composite moral judgment score, $\alpha_{Unintentional}$ = .82, $\alpha_{Intentional}$ = .88.

Risk estimates. Risk was assessed using two different measures for each vignette. The first was a direct measure, using a 7-point scale assessing the likelihood of a negative outcome for each vignette from 1(*very unlikely*) to 7 (*very likely*). The risk estimate questions consisted of: flight vignette, "*What is the likelihood Kevin will miss his flight?*", quarter vignette, "*What is the likelihood someone walking by the Freefall ride will be hit by the quarter?*", and expired food vignette, "*What is the likelihood that one of Jasmine's co-workers who ate the pie will get sick from it*". Since combining risk estimates by condition did not show good reliability, $\alpha_{Unintentional}$ = .31, $\alpha_{Intentional}$ = .35, results are presented both by individual vignette and in aggregate.

Risk was also assessed using indirect measure in the form of hypothetical betting. For each vignette, participants were prompted to "Imagine you are given $100 and a chance to bet" that a negative outcome would occur related to the action. If correct and the negative outcome occurs, the amount participants bet would double. If incorrect and the negative outcome does not occur, the amount participants bet would be lost. They were then asked "How much would you

be willing to bet? Please indicate a dollar ($) amount from 0 to 100". For instance, the expired food vignette betting question stated,

> *Imagine you are given $100 and a chance to bet that one of Jasmine's co-workers will get sick from the expired food. If you are correct and one of Jasmine's co-workers gets sick, the amount you bet will double. If you are incorrect and one of her co-workers does not get sick, the amount you bet will be lost. How much would you be willing to bet? Please indicate a dollar ($) amount from 0 to 100.*

Though combining the bet measure by condition showed to have good reliability, $\alpha_{Unintentional}$ = .79, $\alpha_{Intentional}$ = .85, results are presented both by individual vignette and in aggregate.

Demographics. Lastly, participants completed several demographic items, including gender, age, ethnicity, income, social and economic political orientations, political party affiliation, and religious affiliation, religiosity, and belief in a god or gods, and social and traditional media use. Socioeconomic status was measured using the MacArthur Subjective Status Scale (Adler & Stewart, 200&0, which asks participants to place themselves on a ladder that represents society, with those at the top having the most money, education, and respected jobs, and those at the bottom having the least money, education, and respected jobs. Additional variables that were measured, but will not be reported here, include who they voted for in the 2016 election, belief in karma, and belief in free will (see Appendix for full demographic information).

Results

Manipulation check. As a manipulation check, an independent samples t-test was conducted comparing mean moral judgments between the unintentional and intentional

conditions. A summary of each vignette's mean moral judgment is summarized in *Table 4*. For all three vignettes, the participants in the intentional condition judged the actions as more immoral than participants in who read about the actions being unintentionally committed, flight, $t(395) = -18.92$, $p < .001$, 95% CI[-2.51,-2.04], quarter, $t(403) = -24.80$, $p < .001$, 95% CI[-2.59,-2.21], expired food, $t(400) = -17.96$, $p < .001$, 95% CI[-2.38,-1.91]. Collapsing moral judgment across the three vignettes by condition, participants in the intentional condition reported greater moral condemnation of the actions ($M = 5.77$, $SD = .97$) than did participants in the unintentional condition ($M = 3.49$, $SD = .90$), $t(390) = -25.66$, $p < .001$, 95% CI[-2.45, -2.10] (*Figure 2*). Thus, the moral manipulation worked for each vignette, and overall by condition.

Risk. The main hypothesis for Study 2 was that intentional actions would be judged as more immoral and riskier than the same actions unintentionally committed. A summary of each vignette's mean risk (likelihood) estimate is summarized in *Table 5*. For two of the three vignettes, perceived risk differed significantly such that intentional actions were seen as riskier than if they were unintentional, quarter, $t(403) = -4.46$, $p < .001$, 95% CI[-1.01,-.39], food, $t(406) = -3.01$, $p = .008$, 95% CI[-.83,-.17]. However, there was no significant difference in risk estimates for the third vignette, flight, $t(405) = -1.16$, $p = .25$, 95% CI[-.57,.15]. Collapsing mean likelihood scores across all three vignettes for each condition, results showed that there was a significant difference, such that participants who read vignettes suggesting that each risky action was done intentionally perceived a greater likelihood of related negative outcomes ($M = 3.77$, $SD = 1.31$) than did participants who read vignettes about the same risky behaviors enacted unintentionally ($M = 3.29$, $SD = 1.23$), $t(403) = -4.26$, $p < .001$, 95% CI[-.69,-.25] (*Figure 2*). Overall, risk estimates analyzed individually and in aggregate supported the hypothesis that

intentional actions are not only seen as more morally bad, but also riskier than the same actions unintentionally committed.

Risk was also measured indirectly using a hypothetical betting scenario for each vignette. Mean bet amount per vignette and condition are summarized in *Table 5*. Independent samples t-tests indicated that participants did not differ in the amount that they bet between conditions for any of the three vignettes. Collapsing mean dollar amount bet across all three vignettes, results showed that there was no significant difference in amount bet between the intentional ($M = 5.90$, $SD = 6.32$) and unintentional ($M = 5.89$, $SD = 6.25$) conditions, $t(818) = -.84$, $p = .97$, 95% CI[-.84, .80]. Thus, results from the betting measure did not support the hypothesis.

Discussion

Results from Study 2 supported the hypothesis that moral judgments influences perceptions of risk. Three actions were manipulated to be unintentionally or intentionally committed, and this manipulation successfully created differences in the actions' moral judgments such that intentional actions were more morally condemned. The manipulation also produced significant differences in risk associated with the actions, suggesting that differences in moral judgments lead to differences in perceived risk. The exception was the flight vignette, where a man arrives to an airport with 35 minutes before his flight departs. One reason this vignette may not have worked is that asking participants to calculate timing (e.g., thinking about how long security lines take, plus how long to get to the gate, etc.) could have induced more analytic thinking, thus relying less on how they morally feel about his prior action. Another possibility is that 35 minutes to get through airport security to a gate in this scenario may inherently be unlikely, regardless of any prior action. If he had 45 minutes instead, might the morality of his prior action make him seem more likely to miss his flight? This raises a potential

boundary condition of the effect of morality on risk assessment - actions that are obviously highly likely to happen may not be influenced by moral judgments.

As an exploratory measure, risk was also assessed indirectly using a betting scenario in which participants were expected to bet more money on the likelihood of a negative outcome the more morally bad they judged an action. A likely reason this measure did not work is that it is hypothetical, and thus, participants might not be motivated enough to respond how they truly would otherwise. It is also possible that, similar to calculating time, asking participants to calculate money for scenarios with different outcomes (i.e., in one case their money would double, in another, they would lose their money) induces analytical thinking, thus participants may rely less on moral intuitions to guide their judgment. Additional studies could use real money betting scenarios to see if moral judgments influence risk-based bets when participants have actual stakes in the bet, and investigate how risk calculations involving time and money might evoke analytical thinking that is less prone to influence from moral feelings.

Study 2 was also limited in two additional ways. First, while MTurk provides better generalizability than a student sample, it is important to test this effect across multiple samples to establish its robustness. Second, comparison of unintentional to intentional actions does not provide the ability to distinguish directionality between good and bad intentions. For instance, it is unclear whether good intentioned actions are seen as less risky, bad intentions are seen as more risky, or both, compared to a neutral action in which the intention is unknown. Study 3 aimed to examine this comparison using a different online sample.

Study 3

Study 2 provided evidence that intentional actions are seen as more immoral and riskier than if they are unintentionally committed. However, it is still unclear whether good intentions

26

might be decreasing perceived risk, or bad intentions increasing perceived risk. To test this, I manipulated actions to have either good, ambiguous, or bad intentions. Risk was assessed using the same slider bar from Study 1. I hypothesized that bad intentioned actions would increase perceived risk, and I was agnostic as to whether or not good intentions would decrease risk perception, compared to an ambiguous intention condition.

Method

Participants. Five-hundred and ninety-five participants (346 *Male*; M_{Age} = 35.17, SD_{Age} = 15.76) were recruited from YourMorals.org (YM). YM is a data collection website in which visitors are invited to participate in a number of different studies about morality and ideology, and are given feedback on their responses. Visitors typically find YM by typing keywords related to morality into search engines, or through publicly disseminated psychological research.

Materials. Participants were presented with six vignettes about apolitical actions. For each vignette, participants were randomly assigned to read about the action as having a good, ambiguous, or bad intention. Thus, the vignette conditions were presented within-subjects, such that participants could be randomly assigned to any of the three conditions for each vignette. Vignettes were presented in randomized order to mitigate the potential for ordering effects. However, there is still a potential for dependency of responses between conditions for a given vignette. For instance, since it is possible for a participant to provide moral and risk judgments for the good intention condition of one vignette and bad intention condition of another vignette, responses to the latter vignette may be considered dependent on responses to the former. Hence, between-condition moral and risk judgment results were analyzed separately for each condition, though it is important to note that dependency between vignettes may exist, despite the fact that each vignette is a different contextual scenario. Two of the vignettes were adopted from Study 2,

in order to replicate the previous found effects, namely the quarter and expired food scenarios. Four vignettes were new and consisted of actions related to medicine, a broken car, driving through yellow lights, and crossing train tracks. For example, participants read (see Appendix for a full list of the vignettes):

Medicine vignette

Good intention condition: *Jane has a chronic illness. At her most recent visit to her doctor, Jane was prescribed a new drug that is still in clinical trials and has unknown side effects. The doctor wrote the prescription because he thinks it is the best option for her.*

Ambiguous intention condition: *Jane has a chronic illness. At her most recent visit to her doctor, Jane was prescribed a new drug that is still in clinical trials and has unknown side effects.*

Bad intention condition: *Jane has a chronic illness. At her most recent visit to her doctor, Jane was prescribed a new drug that is still in clinical trials and has unknown side effects. The doctor wrote the prescription because he thinks it will win him favor for an executive position at the drug's company.*

Risk question: *What is the likelihood Jane will have an adverse reaction to the new drug?*

Yellow light vignette

Good intention condition: *After getting off work, John realizes that he left his wife's unwrapped anniversary present on the kitchen table at home. Rushing to get there before his wife does, he drives through multiple yellow lights on the way.*

28

Ambiguous intention condition: *After getting off work, John rushes to get home and drives through multiple yellow lights on the way.*

Bad intention condition: *After getting off work, John realizes that he left his bag of cocaine on the kitchen table at home. Rushing to get there before his wife and kids do, he drives through multiple yellow lights on the way.*

Risk question: *What is the likelihood John will be in a car accident on his way home?*

Moral Judgment. Participants rated the extent to which they found each action justified or unjustified from 1(*always justified*) to 7(*never justified*) and moral or immoral from 1(*very immoral*) to 7 (*very moral*). Combining these two items for each vignette showed moderate to excellent reliability, α_{Range} = .69-.93, α_{Mean} = .82.

Risk estimates. Participants estimated the general likelihood of a negative outcome for each action by using a slider bar from 0% (*not likely at all*) to 100% (*completely likely*) anchored at zero.

Demographics. Demographic information including sex, age, education level, socioeconomic status, and political orientation were collected before participation in the study as part of registering with YM. In addition to these variables, participants indicated at the end of the study their religiosity, belief in a god or gods, and average daily number of hours spent using traditional (e.g., TV, radio) and social media (see Appendix for full demographic information).

Results

Manipulation check. To test whether the moral manipulation was successful, a one-way analysis of variance (ANOVA) was conducted for each vignette with intention as a three-level independent variable (good, ambiguous, bad) and moral judgment as the dependent variable.

Mean moral judgment scores for each condition across vignettes are illustrated in *Figure 3*.

Results showed that all six ANOVAs were significant, Fs = 6.22-415, ps < .003 (*Table 6*). Tukey

HSD post-hoc pairwise comparisons indicated that for all six vignettes, participants judged

actions as more immoral when they were committed with bad intentions compared to when they

committed with good intentions. Furthermore, moral judgments of actions with bad intentions

were judged as significantly more immoral than when the actions were committed with

ambiguous intentions for five of the six vignettes. The one vignette for which there was no

difference in moral judgments between bad and ambiguous intention versions of the action was

the yellow light vignette, where a man who just got off work speeds home through multiple

yellow lights to either hide his wife's anniversary present before she gets home (good intention),

no explanation is given for why he rushes home after work (ambiguous intention), or he speeds

home to hide his cocaine from his wife and kids before they get home (bad intention). Moral

judgments of actions with good versus ambiguous intentions significantly differed for three of

the six vignettes (broken car, yellow light, quarter).

For example, the quarter vignette replicated the moral manipulation from Study 2, $F(2,$

$571) = 415$, $p < .001$, where participants judged throwing a quarter off an amusement park ride

with the intention of hitting someone as more morally bad (bad intention; $M = 6.17$, $SD = .93$)

than if the actor tried, but failed, to prevent the quarter from flying off the ride, (good intention;

$M = 2.91$, $SD = 1.37$), $p < .001$, and if the quarter was flung from the ride unknowingly

(ambiguous intention; $M = 3.73$, $SD = .99$), $p < .001$, while good and ambiguous intention

conditions also significantly differed in moral judgment, $p <. 001$. The expired food vignette also

replicated the moral manipulation from Study 2, $F(2, 578) = 87.11$, $p < .001$, where participants

judged knowingly serving expired food to co-workers without telling them was seen as more

30

morally bad ($M = 5.63$, $SD = 1.05$) than if the food was served knowing it is expired, but providing co-workers with a forewarning about it ($M = 4.23$, $SD = 1.33$), $p < .001$, and if the food was served without knowing it was expired ($M = 3.99$, $SD = 1.38$), $p < .001$. Thus, across the six vignettes, varying the intention behind actions successfully manipulated moral judgments of the action, with clear differences between bad and good intentions, and bad and ambiguous intentions, but less clear differences between good and ambiguous intentions.

Risk. The main hypothesis for Study 3 stated that bad intentioned actions would increase risk estimates relative to the same actions done with good and ambiguous intentions, and I was agnostic as to whether good intentions would decrease risk estimates compared to an ambiguous intentions. Mean risk estimates for each condition across vignettes are illustrated in *Figure 4*. Results showed that four of the six ANOVAs were significant (medicine, expired food, yellow light, quarter), and one was trending toward significance (broken car; see *Table 7*). Tukey HSD post-hoc contrasts indicated that participants' risk estimates of the bad intentioned actions significantly differed from good intentions for three of the six vignettes (medicine, expired food, quarter), and was trending in difference for two other vignettes (broken car, yellow light). Compared to ambiguous intentions, participants who read about the actions as having bad intentions estimated greater likelihood of negative outcomes for three of the six vignettes (medicine, yellow light, quarter), while risk estimates for the good intention versions of the actions did not significantly differ from ambiguous intention for any of the vignettes. This supports the hypothesis that, compared to ambiguous intentions, bad intentions seem to be increasing risk associated with an action rather than good intention behind the action decreasing risk perception.

For example, the quarter vignette replicated the risk estimate pattern from Study 2, $F(2,$ 576) = 13.93, $p < .001$, where participants judged the likelihood of someone walking by an amusement park ride being hit by a quarter as more likely if the quarter was intentionally flung off the ride (bad intention; $M = 27.54$, $SD = 25.89$), than if the actor tried, but failed, to prevent the quarter from flying off the ride, (good intention; $M = 16.76$, $SD = 20.29$), $p < .001$, and if the quarter was accidentally thrown off the ride unknowingly (ambiguous intention; $M = 17.02$, $SD = 20.62$), $p < .001$. There was no difference, however, in participants' risk estimates between the quarter flying off the ride with a good versus ambiguous intention.

The expired food vignette somewhat replicated the risk estimates from Study 2, $F(2, 579)$ = 4.38, $p = .013$. Participants' risk estimates of eating expired food that was intentionally served without forewarning (bad intention; $M = 27.91$, $SD = 25.67$) were significantly different from if the expired food was served, but a forewarning was given (good intention; $M = 20.72$, $SD = 21.86$), $p < .001$, but were not significantly different from if the expired food was unknowingly served (ambiguous intention; $M = 25.09$, $SD = 25.62$), $p = .51$. For a summary of ANOVA results for each vignette, see *Table 7*.

Discussion

In sum, moral judgments and risk estimates were trending in the expected direction for all six actions (as seen in *Figure 3* and *Figure 4*, respectively), and ANOVA results generally supported the hypothesis that participants' moral condemnation and risk estimates increased when reading about actions with bad intentions more so than moral and risk judgments decreased when reading about the same actions with good intentions, relative to when the actions were committed with ambiguous intentions. Indeed, while there were mixed results as far as significant risk estimate differences between bad and ambiguous, and bad and good intentioned

actions, none of the risk estimates significantly between good and ambiguous intentioned actions.

Even though the moral manipulation worked for each vignette, there were two with trending significant differences in risk estimates and one that was completely non-significant. One possibility for these mixed results is the idiosyncratic nature of the vignettes. The scenarios widely differed in context, such as the actor demographics (e.g., gender, societal role), action type (e.g., eating, speeding), and who the risk was to (e.g., the actor versus someone else). It may be that the effect size of the influence of moral judgment on risk perception is different depending on context, thus the present study may have been underpowered to detect this effect in some contexts, but sufficiently powered for others. It is also possible that there were characteristics unique to the vignettes with trending and non-significant risk estimates differences. For instance, while the five vignettes that were significant or trending in risk estimate differences consisted of risks that could cause harm, but not necessarily immediate death, the one vignette that did not have significant risk estimate differences consisted of a risk that could result in immediate death (i.e., being hit by a train). Similar to the non-significant risk estimate difference found in Study 2's flight vignette, it is possible that risks with obvious, or already highly-anchored notions of riskiness, are less influenced by the morality of related actions. Future studies could control characteristics of the situation, such as about the actor and whether the risk is to the actor, the perceiver, or a third party, as well as more directly investigate the effect of moral judgment and different types of risks, to better understand what factors moderate the morality – risk relationship.

Lastly, Study 3 was limited by the complexity of its design. Participants were shown all six vignettes, and randomly assigned to an intention condition for each one. This was done to be

efficient with statistical power in testing the effect of morality on risk perception across a variety

of contexts. By randomizing the ordering of the vignettes, differences across participants would

be dispersed such that results should not be an artifact of vignette ordering. Nonetheless, it is

possible that responses to one condition in any given vignette are dependent on responses to a

different condition in any other vignette. To verify that the present results are not due to

dependency based on vignette ordering, a follow-up study is planned to replicate these results

strictly between subjects.

General Discussion

Theoretical Considerations

Prior research has found risk information processing can be biased by how people feel

about such risks (Slovic & Vastfjall, 2010) and that differences in perceptions of risk are

associated with differences in cultural values (Kahan, 2012). Less is known, however, about how

moral judgments drive risk assessment. The notion of moral coherence, or the aligning of factual

knowledge with how one morally feels about the world to achieve cognitive consistency,

suggests that the inherent cost-benefit nature of risk perception is one such fact that may be

brought in line with one's prescriptive frame of reference (Clark et al., 2015). Initial research by

Liu & Ditto (2012) found using, both artificial and real-world moral dilemmas, that acts judged

as immoral were also perceived as less likely to produce benefits and more likely to engender

harmful costs, and that this relationship was stronger with greater moral conviction, self-reported

knowledge of the issue, and political conservatism. In manipulating the framing of the death

penalty, they found a causal relationship between moral judgements and cost-benefit beliefs such

that participants who read essays about the inherent immorality of capital punishment perceived

it as having less benefits and greater costs than participants who read a pro-capital punishment essay.

Building on this research, I investigated the correlational and causational relationship between moral judgments and perceived risk. Study 1 aimed to establish a significant correlation between moral judgments and risk estimates in a political context. Using an undergraduate student sample, results from Study 1 found that the more participants morally condemned political threats, including abortion, illegal immigration, unlimited political campaign contributions, and nuclear energy, the more they estimated the likelihood of a negative harmful outcome related to the threat. Multiple regression analysis further showed that the overall relationship between moral judgments and physical risk estimates persisted beyond demographic variables and factors related to moral judgment and political threat perception, such as political orientation, religiosity, and media use. However, while the morality-risk relationship appeared to be strong for estimates about physically harmful outcomes, correlations were weak for estimates about socially harmful outcomes.

To improve generalizability and establish a causal relationship, Study 2 aimed to test the effect of moral judgments on risk perception with a different sample. Based on previous research indicating that intention is an important aspect in judging people and actions in moral terms (Cushman, 2008; Dito et al., 2012; Malle, 2006), moral judgments were manipulated in Study 2 by varying whether actions were unintentionally or intentionally committed. Results indicated that the same actions were judged as more immoral and riskier when they were committed intentionally, then if they were committed unintentionally. Although this result supports the notion that moral judgments influence perceived risk, the extent to which bad intentions increase

moral condemnation and risk perception versus good intentions decreasing moral condemnation and risk perception remained unclear.

To further examine this difference, as well as extend the generalizability of this effect beyond undergraduates and MTurk workers, actions were manipulated to have good, ambiguous, or bad intentions in Study 3. Using an online sample from the data collection website YourMorals.org, results indicated that the moral manipulation worked, such that participants judged actions with bad intentions as more morally bad than when they had ambiguous and good intentions, while differences in moral judgment between good and ambiguous intentioned versions of the actions were mixed. Overall, risk estimates generally supported the notion that bad intentions behind an action increase perceived risk more so than good intentions decrease perceived risk, compared to ambiguous intentions. This was evidenced by significantly higher risk estimates for actions with bad, compared to ambiguous and good, intentions in three of the six vignettes, and trending differences in two additional vignettes. Meanwhile, participants' risk estimates did not differ between good and ambiguous intention versions of the actions for any of the vignettes. Taken together, results from these three studies replicate the associations and effect found by Liu and Ditto (2012), and further support the premise that risk perceptions cohere in a moral fashion.

Practical Considerations

Risk assessment is implicated throughout numerous everyday judgments, from taking medications and eating expired food to reaching legal verdicts and supporting political policies. Indeed, the socially constructed nature of risk perception leads to polarized ideological views and controversy over what constitutes risk, when, and what order of actions are needed as a solution (Slovic, 1992, 1999). Controlling the definition of what is risky for the broader population

36

provides an individual or group with power over the ways with which resources are used to

mitigate such risks. This was illustrated in the beginning examples where political leaders

enacted policies based on heightened, but irrational, threat perceptions that ultimately turned out

to be economically detrimental. Given that illegal immigration and sexual deviancy tend to strike

a moral chord with conservatives (Brown & Henriquez, 2008; Crawford, Inbar, & Maloney,

2014; Graham, Haidt, & Nosek, 2009; Herek, 1988; Olatunji, 2008; Rosik, Dinges, & Saavedra,

2013; Shakelford & Besser, 2007; Whitley & Lee, 2000), it is possible that what the politicians

found morally wrong lead them to be afraid of the wrong things. Results from the present studies

support this explanation by finding that participants tended to conflate what they judged as

morally bad with what they estimated to be risky.

Future Directions

The association between moral judgment and risk assessment was found to be significant

across a range of political threats, everyday behaviors, and contexts. The robustness of this effect

is further evidenced by the use of different samples. Since any single sample is limited in its

generalizability, the present studies utilized undergraduate, MTurk, and YM samples, finding

significant associations and effects in each. Risk was also measured a few ways, including a

sliding bar indicating a percent likelihood, a 7-point Likert scale, and through betting money,

though the latter measure did not produce significant results. Future studies can extend this

research by continuing to use different samples (e.g., jury, military personnel, law enforcement,

general public), manipulations of morality (e.g., priming), risk measures (e.g., behavioral,

prioritizing list of threats), and more ecologically valid contexts, such as in assessing threats to

national security. Lastly, given the major political and economic implications of morality

influencing risk perception, it will be important for future studies to investigate how to intervene

to prevent such detrimental outcomes. For instance, some research indicates that moral intuitions

can be overridden by Type 2 processes (e.g., Cushman, Young, & Greene, 2010; Feinberg,

Willer, Antonenko, & John, 2012; Greene, Morelli, Lowenberg, Nystrom, & Cohen, 2008;

Greene, Nystrom, Engell, Darley, & Cohen, 2004; Halperin, Porat, Tamir, & Gross, 2012; Lee,

Sohn, & Fowler, 2013). Investigating whether emotion-regulation strategies, or other ways of

inducing analytical thinking, reduces the effect of moral judgment on perceive risk might be a

fruitful avenue for future research.

References

Abelson, R. P., Kinder, D. R., Peters, M. D., & Fiske, S. T. (1982). Affective and semantic components in political person perception. *Journal of personality and social psychology*, *42*(4), 619-630.

Adler, N., & Stewart, J. (2007). The MacArthur scale of subjective social status. *MacArthur Research Network on SES & Health. Retrieved from http://www. macses. ucsf. edu/Research/Psychosocial/subjective. php*.

Alhakami, A. S., & Slovic, P. (1994). A psychological study of the inverse relationship between perceived risk and perceived benefit. *Risk analysis*, *14*(6), 1085-1096.

Anderson, C., & Galinsky, A. D. (2006). Power, optimism, and risk-taking. *European journal of social psychology*, *36*(4), 511-536.

Barbey, A. K., & Sloman, S. A. (2007). Base-rate respect: From ecological rationality to dual processes. *Behavioral and Brain Sciences*, *30*(3), 241-254.

Baron, J., & Spranca, M. (1997). Protected values. *Organizational behavior and human decision processes*, *70*(1), 1-16.

Bem, D. J. (1972). Self-perception theory. In *Advances in experimental social psychology* (Vol. 6, pp. 1-62). Academic Press.

Blum, S. C., Silver, R. C., & Poulin, M. J. (2014). Perceiving risk in a dangerous world: Associations between life experiences and risk perceptions. *Social Cognition*, *32*(3), 297-314.

Bolte, A., Goschke, T., & Kuhl, J. (2003). Emotion and intuition: Effects of positive and negative mood on implicit judgments of semantic coherence. *Psychological Science*, *14*(5), 416-421.

Braman, D., & Kahan, D. M. (2006). Overcoming the fear of guns, the fear of gun control, and the fear of cultural politics: Constructing a better gun debate. *Emory LJ*, *55*, 569-607.

Brown, M. J., & Henriquez, E. (2008). Socio-Demographic Predictors of Attitudes Towards Gays and Lesbians. *Individual Differences Research*, *6*(3), 193-202.

Clark, C. J., Chen, E. E., & Ditto, P. H. (2015). Moral coherence processes: Constructing culpability and consequences. *Current Opinion in Psychology*, *6*, 123-128.

Clore, G. L., Schwarz, N., & Conway, M. (1994). Affective causes and consequences of social information processing. *Handbook of social cognition*, *1*, 323-417.

Chen, S., & Chaiken, S. (1999). The heuristic-systematic model in its broader context. *Dual-process theories in social psychology*, *15*, 73-96.

Combs, B., & Slovic, P. (1979). Newspaper coverage of causes of death. *Journalism Quarterly*, *56*(4), 837-849.

Côté, S. (2011). How social class shapes thoughts and actions in organizations. *Research in organizational behavior*, *31*, 43-71.

Crawford, J. T., Inbar, Y., & Maloney, V. (2014). Disgust sensitivity selectively predicts attitudes toward groups that threaten (or uphold) traditional sexual morality. *Personality and Individual Differences*, *70*, 218-223.

Cushman, F. (2008). Crime and punishment: Distinguishing the roles of causal and intentional analyses in moral judgment. *Cognition*, *108*(2), 353-380.

Cushman, F., Young, L., & Greene, J. D. (2010). Our multi-system moral psychology: Towards a consensus view. *The Oxford handbook of moral psychology*, 47-71.

Damasio, A. R., & Sutherland, S. (1994). Descartes' error: Emotion, reason and the human brain. *Nature*, *372*(6503), 287-287.

Day, M. V., Fiske, S. T., Downing, E. L., & Trail, T. E. (2014). Shifting liberal and conservative

   attitudes using moral foundations theory. *Personality and Social Psychology Bulletin*,

   40(12), 1559-1573.

Ditto, P. H., & Koleva, S. P. (2011). Moral empathy gaps and the American culture war.

   Emotion Review, *3*(3), 331-332.

Ditto, P. H., Liu, B., & Wojcik, S. P. (2012). Is Anything Sacred Anymore?. *Psychological

   Inquiry*, *23*(2), 155-161.

Ditto, P. H., & Lopez, D. F. (1992). Motivated skepticism: Use of differential decision criteria

   for preferred and nonpreferred conclusions. *Journal of Personality and Social

   Psychology*, *63*(4), 568-584.

Ditto, P. H., Pizarro, D. A., & Tannenbaum, D. (2009). Motivated moral reasoning. *Psychology

   of learning and motivation*, *50*, 307-338.

Ditto, P. H., Scepansky, J. A., Munro, G. D., Apanovitch, A. M., & Lockhart, L. K. (1998).

   Motivated sensitivity to preference-inconsistent information. *Journal of Personality and

   Social Psychology*, *75*(1), 53-69.

Dubois, D., Rucker, D. D., & Galinsky, A. D. (2015). Social class, power, and selfishness: When

   and why upper and lower class individuals behave unethically. *Journal of personality and

   social psychology*, *108*(3), 436-449. doi: 10.1037/pspi0000008

Epstein, S. (1994). Integration of the cognitive and the psychodynamic unconscious. *American

   psychologist*, *49*(8), 709.

Evans, J. S. B. (2003). In two minds: dual-process accounts of reasoning. *Trends in cognitive

   sciences*, *7*(10), 454-459.

Evans, J. S. B., & Stanovich, K. E. (2013). Dual-process theories of higher cognition: Advancing

the debate. *Perspectives on psychological science*, *8*(3), 223-241.

Fehr, E., & Gachter, S. (2000). Cooperation and punishment in public goods experiments. *American Economic Review*, *90*(4), 980-994.

Feinberg, M., Willer, R., Antonenko, O., & John, O. P. (2012). Liberating reason from the passions: Overriding intuitionist moral judgments through emotion reappraisal. *Psychological science*, *23*(7), 788-795.

Festinger, L. (1962). *A theory of cognitive dissonance* (Vol. 2). Stanford university press.

Finucane, M. L., Alhakami, A., Slovic, P., & Johnson, S. M. (2000). The affect heuristic in judgments of risks and benefits. *Journal of behavioral decision making*, *13*(1), 1-17.

Finucane, M. L., Slovic, P., Mertz, C. K., Flynn, J., & Satterfield, T. A. (2000). Gender, race, and perceived risk: The 'white male' effect. *Health, risk & society*, *2*(2), 159-172.

Fischoff, B. (1983). 'Acceptable Risk': The Case of Nuclear Power. *Journal of Policy Analysis and Management*, *2*(4), 559-575.

Fischhoff, B., Slovic, P., & Lichtenstein, S. (1979). Weighing the Risks: Risks: Benefits which Risks are Acceptable?. *Environment: Science and Policy for Sustainable Development*, *21*(4), 17-38.

Fischhoff, B., Slovic, P., & Lichtenstein, S. (1982). Lay foibles and expert fables in judgments about risk. *The American Statistician*, *36*(3b), 240-255.

Fischhoff, B., Slovic, P., Lichtenstein, S., Read, S., & Combs, B. (1978). How safe is safe enough? A psychometric study of attitudes towards technological risks and benefits. *Policy sciences*, *9*(2), 127-152.

Fiske, S. T., & Taylor, S. E. (2013). *Social Cognition: from brains to culture* (2nd edition). Los Angeles: SAGE.

Flynn, J., Slovic, P., & Mertz, C. K. (1994). Gender, race, and perception of environmental

    health risks. *Risk analysis*, *14*(6), 1101-1108.

Frijda, N. H. (1988). The laws of emotion. *American Psychologist*, *43*, 349-358.

Gigerenzer, G. (2010). Personal reflections on theory and psychology. *Theory & Psychology*,

    20(6), 733-743.

Gino, F., Shu, L. L., & Bazerman, M. H. (2010). Nameless+ harmless= blameless: When

    seemingly irrelevant factors influence judgment of (un) ethical behavior. *Organizational*

    Behavior and Human Decision Processes, *111*(2), 93-101.

Gintis, H., Bowles, S., Boyd, R. T., & Fehr, E. (2005). *Moral sentiments and material interests:*

    The foundations of cooperation in economic life. MIT Press, Cambridge, MA.

Graham, J., Haidt, J., Koleva, S., Motyl, M., Iyer, R., Wojcik, S. P., & Ditto, P. H. (2013). Moral

    foundations theory: The pragmatic validity of moral pluralism. In *Advances in*

    experimental social psychology (Vol. 47, pp. 55-130). Academic Press.

Graham, J., Haidt, J., & Nosek, B. A. (2009). Liberals and conservatives rely on different sets of

    moral foundations. *Journal of personality and social psychology*, *96*(5), 1029.

Gray, G. M., & Ropeik, D. P. (2002). Dealing with the dangers of fear: the role of risk

    communication. *Health Affairs*, *21*(6), 106-116.

Greene, J. D., Morelli, S. A., Lowenberg, K., Nystrom, L. E., & Cohen, J. D. (2008). Cognitive

    load selectively interferes with utilitarian moral judgment. *Cognition*, *107*(3), 1144-1154.

Greifeneder, R., Bless, H., & Pham, M. T. (2011). When do people rely on affective and

    cognitive feelings in judgment? A review. *Personality and Social Psychology Review*,

    15(2), 107-141.

Griskevicius, V., Tybur, J. M., Delton, A. W., & Robertson, T. E. (2011). The influence of

mortality and socioeconomic status on risk and delayed rewards: A life history theory

approach. *Journal of Personality and Social Psychology, 100*(6), 1015-1026.

doi: http://dx.doi.org/10.1037/a0022403

Gustafsod, P. E. (1998). Gender Differences in risk perception: Theoretical and methodological

perspectives. *Risk analysis*, *18*(6), 805-811.

Haidt, J. (2001). The emotional dog and its rational tail: a social intuitionist approach to moral

judgment. *Psychological review*, *108*(4), 1024-1057.

Haidt, J. (2012). *The righteous mind: Why good people are divided by politics and religion*.

Vintage.

Haidt, J., & Graham, J. (2007). When morality opposes justice: Conservatives have moral

intuitions that liberals may not recognize. *Social Justice Research*, *20*(1), 98-116.

Haidt, J., & Joseph, C. (2007). The moral mind: How five sets of innate intuitions guide the

development of many culture-specific virtues, and perhaps even modules. *The innate

mind*, *3*, 367-391.

Halperin, E., Porat, R., Tamir, M., & Gross, J. J. (2013). Can emotion regulation change political

attitudes in intractable conflicts? From the laboratory to the field. *Psychological science*,

24(1), 106-111.

Herek, G. M. (1988). Heterosexuals' attitudes toward lesbians and gay men: Correlates and

gender differences. *Journal of sex research*, *25*(4), 451-477.

Johnson, E. J., & Tversky, A. (1983). Affect, generalization, and the perception of risk. *Journal

of personality and social psychology*, *45*(1), 20-31.

Jonas, E., Schulz-Hardt, S., Frey, D., & Thelen, N. (2001). Confirmation bias in sequential

information search after preliminary decisions: an expansion of dissonance theoretical research on selective exposure to information. *Journal of personality and social psychology*, *80*(4), 557-571. doi: 10.1037//0088-3514.80.4.557

Kahan, D. M. (2012). Cultural cognition as a conception of the cultural theory of risk. In *Handbook of risk theory* (pp. 725-759). Springer Netherlands.

Kahan, D. M., & Braman, D. (2006). Cultural cognition and public policy. *Yale Law & Policy Review*, *24*(1), 149-172.

Kahan, D. M., Braman, D., Gastil, J., Slovic, P., & Mertz, C. K. (2007). Culture and identity-protective cognition: Explaining the white-male effect in risk perception. *Journal of Empirical Legal Studies*, *4*(3), 465-505.

Kahan, D., Braman, D., Slovic, P., Gastil, J., & Cohen, G. (2007). The second national risk and culture study: Making sense of-and making progress in-the american culture war of fact.

Kahan, D. M., Braman, D., Slovic, P., Gastil, J., & Cohen, G. (2009). Cultural cognition of the risks and benefits of nanotechnology. *Nature nanotechnology*, *4*(2), 87-90.

Kahan, D. M., Jenkins-Smith, H., & Braman, D. (2011). Cultural cognition of scientific consensus. *Journal of Risk Research*, *14*(2), 147-174.

Kahan, D. M., Wittlin, M., Peters, E., Slovic, P., Ouellette, L. L., Braman, D., & Mandel, G. N. (2011). The tragedy of the risk-perception commons: culture conflict, rationality conflict, and climate change.

Kahneman, D., & Tversky, A. (1972). Subjective probability: A judgment of representativeness. *Cognitive psychology*, *3*(3), 430-454.

Kahneman, D., & Tversky, A. (1973). On the psychology of prediction. *Psychological review*, *80*(4), 237-251.

Keren, G., & Schul, Y. (2009). Two is not always better than one: A critical evaluation of two-system theories. *Perspectives on psychological science*, *4*(6), 533-550.

Kish-Gephart, J. J. (2017). Social class & risk preferences and behavior. *Current opinion in psychology*, *18*, 89-92.

Kruglanski, A. W., & Gigerenzer, G. (2011). Intuitive and deliberate judgments are based on common principles. *Psychological review*, *118*(1), 97-109.

Kuhn, D. (2013). Reasoning. In P. D. Zelazo (Ed.) *The Oxford handbook of developmental psychology* (Vol. 1, pp.744-764). New York, NY: Oxford University Press. doi: 10.1093/oxfordhb/9780199958450.013.0026

Kunda, Z. (1990). The case for motivated reasoning. *Psychological bulletin*, *108*(3), 480-498.

Lee, C. (2008). The gay panic defense. *UC Davis L. Rev.*, *42*, 471-566.

Lee, J. J., Sohn, Y., & Fowler, J. H. (2013). Emotion regulation as the foundation of political attitudes: does reappraisal decrease support for conservative policies?. *PloS one*, *8*(12), e83143.

Lerner, J. S., Gonzalez, R. M., Small, D. A., & Fischhoff, B. (2003). Effects of fear and anger on perceived risks of terrorism: A national field experiment. *Psychological science*, *14*(2), 144-150.

Lerner, J. S., & Keltner, D. (2001). Fear, anger, and risk. *Journal of personality and social psychology*, *81*(1), 146-159.

Lerner, J. S., & Tetlock, P. E. (1999). Accounting for the effects of accountability. *Psychological bulletin*, *125*(2), 255-275.

Lieberman, M. D. (2000). Intuition: a social cognitive neuroscience approach. *Psychological bulletin*, *126*(1), 109-137. doi: 10.1037/0033-2909.126.1.109

Liu, B. S., & Ditto, P. H. (2013). What dilemma? Moral evaluation shapes factual belief. *Social Psychological and Personality Science*, *4*(3), 316-323. doi: 10.1177/1948550612456045

Lodge, M., & Taber, C. S. (2005). The automaticity of affect for political leaders, groups, and issues: An experimental test of the hot cognition hypothesis. *Political Psychology*, *26*(3), 455-482.

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), 2098-2109.

Lottes, I. L., & Kuriloff, P. J. (1992). The effects of gender, race, religion, and political orientation on the sex role attitudes of college freshmen. *Adolescence*, *27*(107), 675-688.

MacCoun, R. J. (1998). Biases in the interpretation and use of research results. *Annual review of psychology*, *49*(1), 259-287.

Malle, B. F. (2006). Intentionality, morality, and their relationship in human judgment. *Journal of Cognition and Culture*, *6*(1), 87-112.

Mallory, C., & Sears, B. (2016). *Discrimination, Diversity, and Development: The Legal and Economic Implications of North Carolina's HB2*. Williams Institute.

Masicampo, E. J., & Baumeister, R. F. (2008). Toward a physiology of dual-process reasoning and judgment: Lemonade, willpower, and expensive rule-based analysis. *Psychological Science*, *19*(3), 255-260.

Mosteller, F., & Nogee, P. (1951). An experimental measurement of utility. *Journal of Political Economy*, *59*(5), 371-404.

Munro, G. D., & Ditto, P. H. (1997). Biased assimilation, attitude polarization, and affect in

reactions to stereotype-relevant scientific information. *Personality and Social Psychology Bulletin*, *23*(6), 636-653.

Mynatt, C. R., Doherty, M. E., & Tweney, R. D. (1977). Confirmation bias in a simulated research environment: An experimental study of scientific inference. *The quarterly journal of experimental psychology*, *29*(1), 85-95.

National Safety Council. (2018). *NSC Motor Vehicle Fatality Estimates*. Retrieved from https://www.nsc.org/road-safety/safety-topics/fatality-estimates

Nickerson, R. S. (1998). Confirmation bias: A ubiquitous phenomenon in many guises. *Review of general psychology*, *2*(2), 175-220.

Nowrasteh, A. (2016, September 13). *Terrorism and immigration* (Policy Analysis, pp. 1-28, Rep. No. 798). Cato Institute Center for Global Liberty and Prosperity. Retrieved from https://www.cato.org/publications/policy-analysis/terrorism-immigration-risk-analysis

Olatunji, B. O. (2008). Disgust, scrupulosity and conservative attitudes about sex: Evidence for a mediational model of homophobia. *Journal of Research in Personality*, *42*(5), 1364-1369.

Oliver, J. E., & Rahn, W. M. (2016). Rise of the Trumpenvolk: Populism in the 2016 Election. *The ANNALS of the American Academy of Political and Social Science*, *667*(1), 189-206.

Osman, M. (2004). An evaluation of dual-process theories of reasoning. *Psychonomic bulletin & review*, *11*(6), 988-1010.

Peters, E., Hibbard, J., Slovic, P., & Dieckmann, N. (2007). Numeracy skill and the communication, comprehension, and use of risk-benefit information. *Health Affairs*, *26*(3), 741-748.

Peters, E., Västfjäll, D., Slovic, P., Mertz, C. K., Mazzocco, K., & Dickert, S. (2006). Numeracy

and decision making. *Psychological science*, *17*(5), 407-413.

Petty, R. E., & Cacioppo, J. T. (1986). The elaboration likelihood model of persuasion. In *Communication and persuasion* (pp. 1-24). Springer New York.

Piff, P. K., Stancato, D. M., Côté, S., Mendoza-Denton, R., & Keltner, D. (2012). Higher social class predicts increased unethical behavior. *Proceedings of the National Academy of Sciences*, *109*(11), 4086-4091.

R Core Team (2016). R: A language and environment for statistical computing. R foundation for statistical computing, Vienna, Austria. Retrieved from https://www.R-project.org.

Redlawsk, D. P. (2002). Hot cognition or cool consideration? Testing the effects of motivated reasoning on political decision making. *Journal of Politics*, *64*(4), 1021-1044.

Rosik, C. H., Dinges, L. J., & Saavedra, N. (2013). Moral intuitions and attitudes toward gay men: Can moral psychology add to our understanding of homonegativity?. *Journal of Psychology and Theology*, *41*(4), 315-326.

Rudolph, T. J. (2006). Triangulating political responsibility: The motivated formation of responsibility judgments. *Political Psychology*, *27*(1), 99-122.

Schneider, W., & Shiffrin, R. M. (1977). Controlled and automatic human information processing: I. Detection, search, and attention. *Psychological review*, *84*(1), 1-66.

Schulte, L. J., & Battle, J. (2004). The relative importance of ethnicity and religion in predicting attitudes towards gays and lesbians. *Journal of Homosexuality*, *47*(2), 127-142.

Schwarz, N., & Clore, G. L. (2007). Feelings and phenomenal experiences. In A. Kruglanski & E. T. Higgins (Eds.) *Social psychology. Handbook of basic principles* (pp. 285-407). New York: Guilford.

Shackelford, T. K., & Besser, A. (2007). Predicting Attitudes toward Homosexuality: Insights

from Personality Psychology. *Individual Differences Research*, *5*(2), 106-114.

Shiffrin, R. M., & Schneider, W. (1977). Controlled and automatic human information processing: II. Perceptual learning, automatic attending and a general theory. *Psychological review*, *84*(2), 127-190.

Simon, D., Krawczyk, D. C., & Holyoak, K. J. (2004). Construction of preferences by constraint satisfaction. *Psychological Science*, *15*(5), 331-336.

Sloman, S. A. (1996). The empirical case for two systems of reasoning. *Psychological bulletin*, *119*(1), 3-22.

Slovic, P. (1987). Perception of risk. *Science*, *236*(4799), 280-285.

Slovic, P. (1992). Perception of risk: Reflections on the psychometric paradigm. In D. Golding & S. Krimsky (Eds.), *Social theories of risk* (pp. 117-152). New York: Praeger.

Slovic, P. (1999). Trust, emotion, sex, politics, and science: Surveying the risk-assessment battlefield. *Risk analysis*, *19*(4), 689-701.

Slovic, P., Finucane, M. L., Peters, E., & MacGregor, D. G. (2002). The affect heuristic. In T. Gilovich, D. Griffin, & D. Kahneman (Eds.), *Heuristics and biases: The psychology of intuitive judgment* (pp. 397-420). New York, NY: Cambridge University Press.

Slovic, P., Finucane, M. L., Peters, E., & MacGregor, D. G. (2007). The affect heuristic. *European journal of operational research*, *177*(3), 1333-1352.

Slovic, P., & Västfjäll, D. (2010). Affect, moral intuition, and risk. *Psychological Inquiry*, *21*(4), 387-398.

Smith, E. R., & DeCoster, J. (2000). Dual-process models in social and cognitive psychology: Conceptual integration and links to underlying memory systems. *Personality and social psychology review*, *4*(2), 108-131.

Soffen, K. & Lu, D. (2017, March 16). What Trump cut in his agency budgets. *The Washington Post*. Retrieved from https://www.washingtonpost.com/graphics/politics/trump-presidential-budget-2018-proposal/?utm_term=.fda5acff5ee0

Starr, C. (1969). Social benefit versus technological risk. *Science*, 1232-1238.

Stanovich, K. E., & West, R. F. (2000). Individual differences in reasoning: Implications for the rationality debate?. *Behavioral and brain sciences*, *23*(5), 645-665.

Steele, C. M. (1988). The psychology of self-affirmation: Sustaining the integrity of the self. In *Advances in experimental social psychology* (Vol. 21, pp. 261-302). Academic Press.

Steinmetz (2015, July 28). Everything you need to know about the debate over transgender people and bathrooms. *TIME*. Retrieved from http://time.com/3974186/transgender-bathroom-debate/

Taber, C. S., Cann, D., & Kucsova, S. (2009). The motivated processing of political arguments. *Political Behavior*, *31*(2), 137-155.

Taber, C. S., Lodge, M., & Glathar, J. (2001). The motivated construction of political judgments. *Citizens and politics: Perspectives from political psychology*, 198-226.

Tetlock, P. E. (2003). Thinking the unthinkable: Sacred values and taboo cognitions. *Trends in cognitive sciences*, *7*(7), 320-324.

Thagard, P. (2002). *Coherence in thought and action*. MIT press.

Topolinski, S., & Strack, F. (2009). The architecture of intuition: Fluency and affect determine intuitive judgments of semantic and visual coherence, and of grammaticality in artificial grammar learning. *Journal of Experimental Psychology: General*, *138*(1), 39-63.

Tversky, A., & Kahneman, D. (1971). Belief in the law of small numbers. *Psychological bulletin*, *76*(2), 105-110.

Tversky, A., & Kahneman, D. (1973). Availability: A heuristic for judging frequency and probability. *Cognitive psychology*, *5*(2), 207-232.

Tversky, A., & Kahneman, D. (1974). Judgment under uncertainty: Heuristics and biases. *science*, *185*(4157), 1124-1131.

Uhlmann, E. L., Pizarro, D. A., Tannenbaum, D., & Ditto, P. H. (2009). The motivated use of moral principles. *Judgment and Decision making*, *4*(6), 479-491.

Westen, D., Blagov, P. S., Harenski, K., Kilts, C., & Hamann, S. (2006). Neural bases of motivated reasoning: An fMRI study of emotional constraints on partisan political judgment in the 2004 US presidential election. *Journal of cognitive neuroscience*, *18*(11), 1947-1958.

Whitley, B. E., & Lee, S. E. (2000). The relationship of authoritarianism and related constructs to attitudes toward homosexuality. *Journal of applied social psychology*, *30*(1), 144-170.

Wyer Jr, R. S., & Frey, D. (1983). The effects of feedback about self and others on the recall and judgments of feedback-relevant information. *Journal of Experimental Social Psychology*, *19*(6), 540-559.

Zajonc, R. B. (1980). Feeling and thinking: Preferences need no inferences. *American psychologist*, *35*(2), 151-175.

Zakaria, F. (2016). Populism on the March: Why the West is in Trouble. *Foreign Affairs*, *95*, 9-15.

Tables and Figures

Table 1. Study 1 descriptive statistics of moral judgment and risk estimates for each political threat by participant political orientation (liberal n = 159, moderate n = 72, conservative n = 44)[a]

Political Threat	Mean Moral Judgment$_s$ (SD)			Mean Physical Risk Estimate (SD)			Mean Social Risk Estimate (SD)		
	Lib.	Mod.	Con.	Lib.	Mod.	Con.	Lib.	Mod.	Con.
Decision to end a pregnancy	3.26 (1.53)	3.89 (1.47)	4.38 (1.89)	53.04 (26.34)	61.42 (25.46)	63.88 (25.41)	76.26 (18.45)	77.25 (16.62)	80.21 (17.03)
Restrictive gun laws	2.69 (1.39)	3.13 (1.40)	3.82 (1.68)	46.02 (31.20)	46.40 (28.55)	59.14 (25.85)	51.68 (24.66)	52.56 (23.26)	56.07 (25.75)
Safe homosexual sex	2.09 (1.40)	3.01 (1.57)	3.88 (2.27)	31.81 (26.22)	41.65 (23.69)	42.73 (30.22)	61.33 (27.26)	63.26 (21.44)	62.60 (22.64)
Crossing your country's border illegally	3.49 (1.43)	3.95 (1.42)	4.36 (1.54)	27.95 (21.92)	46.84 (23.71)	37.66 (21.81)	64.64 (24.19)	68.25 (21.56)	63.55 (24.38)
Legalizing recreational marijuana	3.49 (1.43)	3.95 (1.42)	4.36 (1.54)	27.95 (21.92)	37.66 (23.71)	46.84 (21.81)	64.64 (24.19)	68.25 (21.56)	63.55 (24.38)
Unlimited campaign contributions	5.07 (1.30)	4.54 (1.14)	4.51 (1.27)	71.82 (23.75)	65.00 (19.50)	65.50 (21.99)	60.93 (22.31)	58.80 (20.61)	61.88 (21.68)
Nuclear energy use	4.55 (1.45)	4.33 (1.32)	4.11 (1.45)	72.64 (26.27)	75.46 (22.93)	67.40 (25.30)	61.84 (23.41)	59.78 (25.68)	58.48 (24.76)
Genetically modified food	4.17 (1.47)	4.38 (1.05)	4.38 (1.34)	63.56 (25.54)	68.54 (22.68)	66.98 (25.34)	53.98 (24.31)	54.10 (20.51)	56.00 (21.82)
American military operations overseas	4.48 (1.24)	3.81 (1.25)	3.74 (1.20)	65.68 (23.63)	68.12 (17.73)	65.90 (21.44)	51.96 (25.15)	53.39 (24.01)	46.54 (25.81)
Oil and coal energy use	4.31 (1.20)	3.59 (1.08)	3.71 (1.05)	82.01 (16.91)	71.87 (15.67)	74.52 (16.56)	52.39 (27.41)	48.27 (22.34)	57.18 (22.23)

_aNumbers vary from total sample size due to missing data; The first five political threats were hypothesized to be found more immoral and threatening to conservatives, and the last five threats were hypothesized to be more immoral threatening to liberals.; Lib. = liberal, Mod.

Table 2. Study 1 descriptive statistics and zero-order correlations between composite moral judgment and physical risk estimate for each political threat.

Political Threat	Mean Moral Judgment$_s$ (SD)	Mean Physical Risk Estimate (SD)	r	95% Confidence Intervals	
				Lower Limit	Upper Limit
Decision to end a pregnancy	3.62 (1.85)	56.96 (29.43)	.30***	.19	.41
Restrictive gun laws	3.00 (1.67)	48.38 (32.61)	.46***	.36	.55
Safe homosexual sex	2.62 (1.86)	36.02 (30.32)	.36***	.24	.46
Crossing your country's border illegally	3.76 (1.65)	34.12 (26.71)	.41***	.30	.51
Legalizing recreational marijuana	3.35 (1.90)	49.22 (30.70)	.66***	.58	.72
Unlimited campaign contributions	4.83 (1.43)	68.92 (25.51)	.43***	.32	.52
Nuclear energy use	4.42 (1.59)	72.44 (27.58)	.60***	.52	.67
Genetically modified food	4.26 (1.50)	65.20 (27.41)	.55***	.46	.63
American military operations overseas	4.18 (1.42)	66.31 (24.03)	.25**	.13	.36
Oil and coal energy use	4.03 (1.26)	78.13 (19.43)	.31***	.20	.42

* $p < .05$; ** $p < .01$; *** $p < .001$; Bonferroni corrected for multiple comparisons

Table 3. Study 1 descriptive statistics and zero-order correlations between composite moral judgment and social risk estimate for each political threat.

Political Threat	Mean Moral Judgment$_s$ (SD)	Mean Social Risk Estimate (SD)	r	95% Confidence Intervals	
				Lower Limit	Upper Limit
Decision to end a pregnancy	3.62 (1.85)	77.13 (19.56)	.15^	.03	.27
Restrictive gun laws	3.00 (1.67)	52.67 (27.81)	.08	-.05	.20
Safe homosexual sex	2.62 (1.86)	62.13 (27.97)	.07	-.05	.19
Crossing your country's border illegally	3.76 (1.65)	65.34 (26.10)	-.04	-.16	.09
Legalizing recreational marijuana	3.35 (1.90)	59.25 (30.04)	.20^	.08	.32
Unlimited campaign contributions	4.83 (1.43)	60.49 (24.52)	.09	-.03	.21
Nuclear energy use	4.42 (1.59)	60.71 (27.45)	.47***	.37	.56
Genetically modified food	4.26 (1.50)	54.17 (25.87)	.27***	.15	.38
American military operations overseas	4.18 (1.42)	51.51 (28.43)	-.001	-.13	.13
Oil and coal energy use	4.03 (1.26)	52.02 (29.12)	.13^	.01	.25

* $p < .05$; ** $p < .01$; *** $p < .001$; Bonferroni corrected for multiple comparisons; ^ significant before correction

Figure 1. Study 1 results illustrated an overall significant correlation between moral condemnation and physical risk estimates across the ten political threats.

Table 4. *Study 1 standardized correlates of overall physical risk estimation (N = 178)[a]*

Variable	β	(95% CI)	SE	t
Gender				
Male (female = 0)	-.27	(-.56, .02)†	.15	-1.82
Income	-.04	(-.18, .10)	.07	-.58
Political orientation[b]	.12	(-.02, .26)†	.07	1.68
Ethnicity (white = 0)				
Asian/ Pacific Islander	-.65	(-1.04, -.26)**	.20	-3.26
Black/ African-American	-.71	(-1.79, .38)	.55	-1.29
Hispanic	-.26	(-.59, .08)	.17	-1.53
Other	-.46	(-.94, .02)†	.24	-1.88
Religiosity	-.04	(-.26, .18)	.11	-.39
Belief in a god or gods	.12	(-.09, .34)	.11	1.11
Media Use				
Traditional (e.g., TV, radio)	.05	(-.09, .19)	.07	.76
Social (e.g., Facebook, Twitter)	.03	(-.11, .17)	.07	.43
Moral judgment[c]	.33	(.18, .48)***	.08	4.39
Intercept	.33	(.10, .56)**	.12	2.78
Model statistics	$F(12, 165) = 4.38, p < .001; R^2 = .24$			

†$p < .10$; *$p < .05$; **$p < .01$; ***$p < .001$; [a]N varies from total sample size due to missing data; [b]Averaged between social and economic political orientation scores, higher score = more conservative; [c]Higher = more immoral

Table 5. Study 2 descriptive statistics of moral judgments and risk estimates, and independent-samples t-tests between conditions for moral judgments and Likert-scale risk estimates for each vignette.

Vignette	Moral Judgment				Risk Estimate				Bet Amount ($)			
	Mean (SD)		t	95% CI	Mean (SD)		t	95% CI	Mean (SD)		t	95% CI
	Unint.	Int.			Unint.	Int.			Uint.	Int.		
Flight	2.97 (1.28)	5.24 (1.43)	-18.92	-2.51, -2.04 ***	3.82 (2.09)	4.03 (2.10)	-1.16	-.57, .15	6.11 (7.03)	5.49 (6.26)	1.32	-.30, 1.53
Quarter	3.68 (.93)	6.08 (1.03)	-24.80	-2.59, -2.21 ***	2.59 (1.64)	3.29 (1.85)	-4.46	-1.01, -.39 ***	5.53 (6.23)	5.72 (6.43)	-.43	-1.06, .68
Expired food	3.83 (1.40)	5.98 (1.15)	-17.96	-2.38, -1.91 ***	3.47 (1.89)	3.98 (1.96)	-3.01	-.83, -.17 **	6.02 (6.86)	6.50 (7.64)	-.93	-1.48, .53

* p < .05; ** p < .01; *** p < .001; Bonferroni corrected for multiple comparisons; Uint. = unintentional condition; Int. = intentional condition; CI = confidence intervals
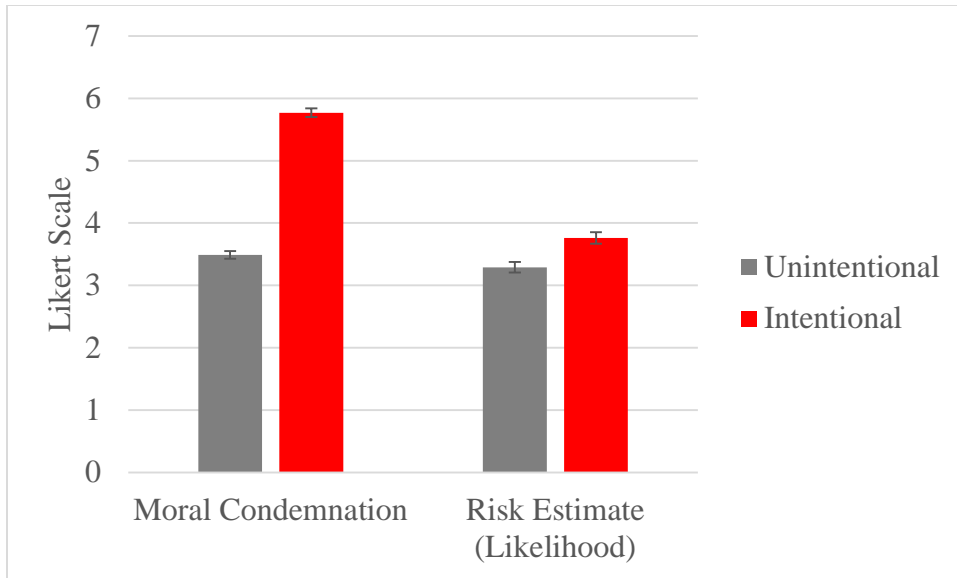
Figure 2. Results from study 2 showing that actions committed intentionally were seen as more immoral and riskier than the same actions unintentionally committed. Bars represent standard error.
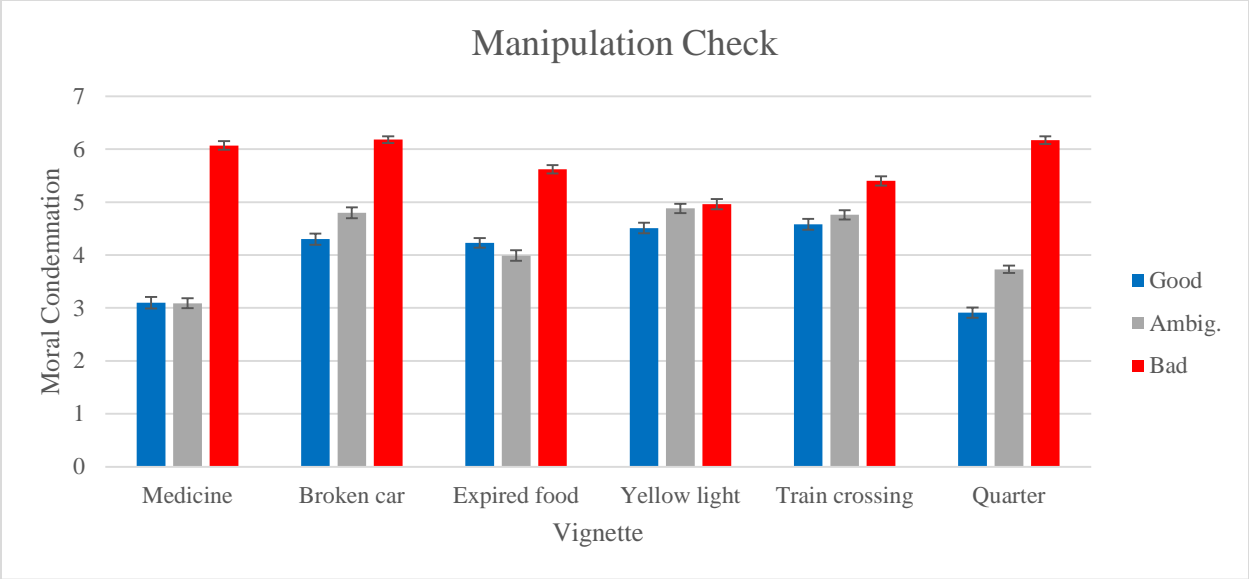
Figure 3. Study 3 manipulation check results showing mean moral judgment across the three

conditions (good, ambiguous, bad) for each of the six vignettes. Bars represent standard error.

Table 6. Study 3 ANOVA and Tukey HSD results for moral judgments of each vignette.

Vignette	F-value (df)	Difference between means (95% CI)		
		Good – Ambig.	Bad – Ambig.	Good – Bad
Medicine	310.20***	-.01	2.97***	2.97***
	(2 ,575)	(-.32, .31)	(2.65, 3.29)	(2.64, 3.29)
Broken car	114.30***	.50**	1.37***	1.88***
	(2, 579)	(.19, .81)	(1.07, 1.68)	(1.57, 2.18)
Expired food	87.11***	-.23	1.63***	1.39***
	(2, 578)	(-.53, .06)	(1.31, 1.94)	(1.09, 1.70)
Yellow light	6.22**	.37*	.08	.45*
	(2, 574)	(.05, .70)	(-.23, .39)	(.14, .77)
Train crossing	20.10***	.18	.64***	.82***
	(2, 570)	(-.13, .49)	(.32, .95)	(.50, 1.13)
Quarter	415***	.82***	2.44***	3.26***
	(2, 571)	(.56, 1.08)	(2.17, 2.72)	(2.99, 3.54)

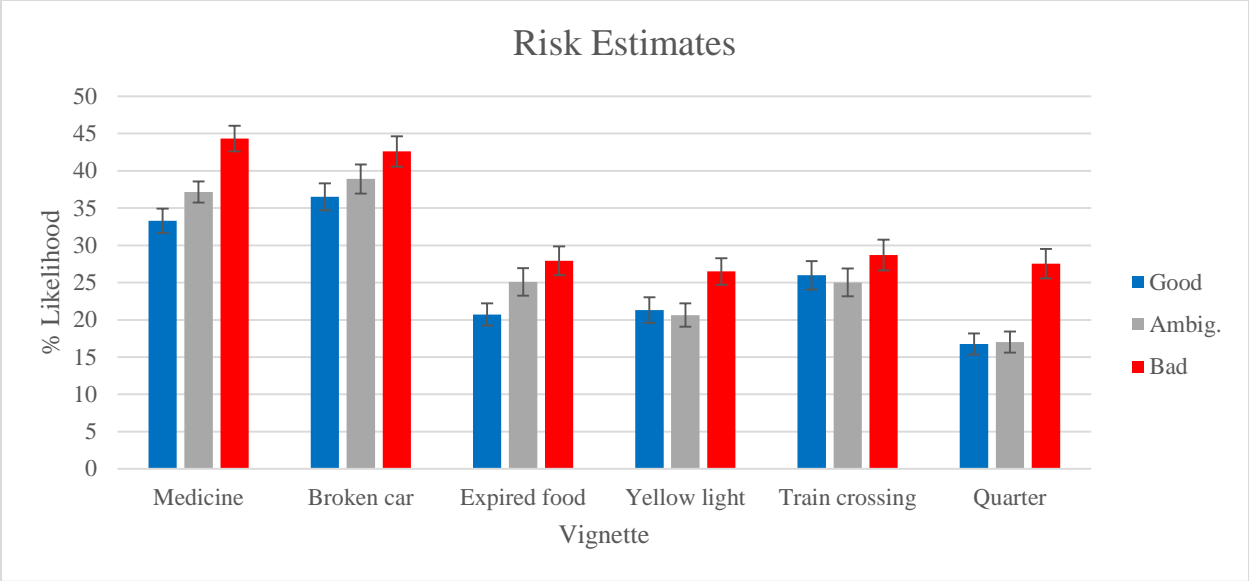† $p < .10$; * $p < .05$; ** $p < .01$; *** $p < .001$

Figure 4. Study 3 results showing mean risk estimates across the three conditions (good, ambiguous, bad) for each of the six vignettes. Bars represent standard error.

Table 7. Study 3 ANOVA and Tukey HSD results for risk estimates of each vignette.

Vignette	F-value (df)	Difference between means (95% CI)		
		Good – Ambig.	Bad – Ambig.	Good – Bad
Medicine	12.21***	3.86	7.19**	11.05***
	(2, 578)	(-1.33, 9.04)	(1.91, 12.47)	(5.73, 16.37)
Broken car	2.50†	2.39	3.68	6.07†
	(2, 580)	(-4.09, 8.97)	(-2.73, 10.10)	(-.39, 12.53)
Expired food	4.38*	4.37	2.83	7.19**
	(2, 579)	(-1.31, 10.04)	(-3.15, 8.80)	(1.38, 13)
Yellow light	3.70*	-.67	5.85*	5.18†
	(2,574)	(-6.43, 5.09)	(.33, 11.37)	(-.50, 10.86)
Train crossing	.93	-.96	2.73	3.69
	(2, 572)	(-7.40, 548)	(-3.82, 9.28)	(-2.86, 10.24)
Quarter	13.93***	.27	10.51***	10.78***
	2, 576)	(-4.92, 5.45)	(5.15, 15.88)	(5.34, 16.22)

† $p < .10$; * $p < .05$; ** $p < .01$; *** $p < .001$

Appendix

Study 1

Study 1 participant demographic characteristics (N = 277)

Variable	Percent (%)	Mean	Std. Dev.
Gender			
Female	63.54		
Male	36.10		
Other	0.36		
Age			
18-21	82.54		
22-25	13.10		
26-30	2.38		
31-40	1.98		
Ethnicity			
Asian/ Pacific-Islander	42.39		
Black/ African-American	2.17		
Hispanic	30.80		
White	16.30		
Other	8.34		
Political Party			
Democrat	52.19		
Republican	5.84		
Libertarian	2.55		
Other	1.83		
No party affiliation	37.59		
Religious Affiliation			
Agnostic	16.30		
Atheist	11.85		
Buddhist	7.80		
Christian (Catholic)	27.80		
Christian (Protestant)	11.44		
Christian (Other)	13.70		
Hindu	1.85		
Jewish	0.00		
Muslim	2.96		
Other	6.30		
Political Orientation$_a$			
Social		3.00	1.64
Economic		3.43	1.57

Religiosity[b]	3.28	2.14
Belief in a god or gods[c]	4.48	2.49
Income[d]	3.39	2.39

[a]Higher = more conservative; [b]Higher = more religious; [c]Higher = more belief in a god or gods; [d]Income was measured in seven $20,000 intervals from $0 – 19,999 to $120,000 or higher

Study 1 threats and physical risk questions.

Threat	Physical Risk Question
Decision to end a pregnancy	What is the likelihood that a woman who decides to end her pregnancy will have subsequent mental or physical health issues?
Restrictive gun laws	What is the likelihood that restrictive gun laws will decrease the number of gun related injuries? (r)
Safe homosexual sex	What is the likelihood of contracting a sexually transmitted disease from protected homosexual sex?
Crossing your country's border illegally	What is the likelihood that someone who crossed your country's border illegally is a violent criminal?
Legalizing recreational marijuana ($\alpha = .81$)	What is the likelihood that using recreational marijuana will cause physical harm to the user?
	What is the likelihood that legalizing recreational marijuana will lead to an increase in other "hard" drug use?
Unlimited campaign contributions	What is the likelihood that lifted corporate environmental regulations can negatively influence your health?
Nuclear energy use	What is the likelihood that using nuclear energy can cause a significant disaster?
Genetically modified food	What is the likelihood that consuming genetically modified food can cause physical health issues?
American military operations	What is the likelihood that American military operations overseas can lead to a terrorist attack on American soil?
Oil and coal use for energy ($\alpha = .76$)	What is the likelihood that using oil and coal for energy can lead to global climate change?

	What is the likelihood that global climate change can directly impact health?
r = reverse coded	

Study 1 threats and social risk questions.

Threat	Social Risk Question
Decision to end a pregnancy	What is the likelihood of being negatively evaluated by others for deciding to end a pregnancy?
Restrictive gun laws	What is the likelihood of being negatively evaluated by others for supporting restrictive gun laws?
Safe homosexual sex	What is the likelihood of being negatively evaluated by others for having safe homosexual sex?
Crossing your country's border illegally	What is the likelihood of being negatively evaluated by others for crossing your country's border illegally?
Legalizing recreational marijuana	What is the likelihood of being negatively evaluated by others for using recreational marijuana?
Unlimited campaign contributions	What is the likelihood of being negatively evaluated by others for supporting unlimited political campaign contributions?
Nuclear energy use	What is the likelihood of being negatively evaluated by others for supporting the use of nuclear energy?
Genetically modified food	What is the likelihood of being negatively evaluated by others for supporting genetically modified food?
American military operations	What is the likelihood of being negatively evaluated by others for supporting American military operations overseas?
Oil and coal use for energy	What is the likelihood of being negatively evaluated by others for using oil and coal for energy?

Study 2

Study 2 participant demographic characteristics (N = 410)

Variable	Percent (%)	Mean	Std. Dev.
Gender			
Female	40.35		
Male	58.66		
Other	0.99		
Ethnicity			
Asian/ Pacific-Islander	77.97		
Black/ African-American	9.16		
Hispanic/ LatinX	3.96		
Middle Eastern	4.21		
Multiracial	0.50		
Native American/ Indigenous Peoples	0.74		
White	0.50		
Other	2.96		
Political Party			
Democrat	47.52		
Republican	3.96		
Libertarian	23.02		
Other	3.72		
No party affiliation	21.78		
Religious Affiliation			
Agnostic	21.73		
Atheist	15.06		
Buddhist	1.48		
Christian (Catholic)	17.04		
Christian (Protestant)	22.47		
Christian (Other)	9.38		
Hindu	2.47		
Muslim	1.23		
Other	9.14		
Age		39.80	14.43
Income$_a$		3.21	1.81
SES$_b$		4.46	1.76
Political Orientation			
Social		3.39	2.01
Economic		3.79	2.05
Religiosity		3.22	2.47

Belief in a god or gods	4.29	2.75
Free will belief	5.93	1.23
Karma belief	4.45	2.33
Media hours per day		
Traditional (TV, radio, etc.)	3.03	1.76
Social	2.23	1.48

[a]Income was measured in seven $20,000 intervals from $0 – 19,999 to $120,000 or higher; [b]Socio-economic status was measured using the MacArthur Subjective Status Scale in which participants place themselves on an 11-rung ladder representing society, where higher numbers indicate more educated, better jobs, and more respected, and lower numbers indicate less educated, worse or no jobs, and less respected.

Study 3

Study 3 participant demographic characteristics (N = 595)

Variable	Percent (%)	Mean	Std. Dev.
Gender			
Female	37.18		
Male	62.82		
Education			
Currently in high school	7.34		
Some high school	0.56		
Completed high school	3.39		
Currently in college/ university	25.24		
Some college/ university	8.47		
Completed college/ university	21.85		
Currently in graduate/ professional school	6.21		
Some graduate/ professional school	5.65		
Completed graduate/ professional school	21.28		
Political Orientation			
Conservative	18.84		
Libertarian	12.50		
Moderate	14.13		
Liberal	47.83		
Other	2.54		
Don't know/ not political	4.16		
Age		35.17	15.76
SES$_a$		6.38	1.99
Political Orientation			
Social			
Economic			
Religiosity		2.64	2.13
Belief in a god or gods		3.28	2.66
Media hours per day			
Traditional (TV, radio, etc.)		2.09	1.32
Social		2.26	1.53

[a]Socio-economic status was measured using the MacArthur Subjective Status Scale in which participants place themselves on an 11-rung ladder representing society, where higher numbers indicate more educated, better jobs, and more respected, and lower numbers indicate less educated, worse or no jobs, and less respected.

Study 3 vignettes and risk questions.

Vignette	Good Intention	Unintentional	Bad Intention	Risk Question
Medicine	Jane has a chronic illness. At her most recent visit to her doctor, Jane was prescribed a new drug that is still in clinical trials and has unknown side effects. The doctor wrote the prescription because he thinks it is the best option for her.	Jane has a chronic illness. At her most recent visit to her doctor, Jane was prescribed a new drug that is still in clinical trials and has unknown side effects.	Jane has a chronic illness. At her most recent visit to her doctor, Jane was prescribed a new drug that is still in clinical trials and has unknown side effects. The doctor wrote the prescription because he thinks it will win him favor for an executive position at the drug's company.	What is the likelihood Jane will have an adverse reaction to the new drug?
Broken car	Sean is a father with three kids who he drives to school every day. Noticing his car was acting up recently, he took it into a mechanic. The mechanic told him there is a serious issue with the car that may cause him to lose control of it. A week later, the car still hasn't been fixed because Sean has been working overtime to be able to afford the repairs.	Sean is a father with three kids who he drives to school every day. Noticing his car was acting up recently, he took it into a mechanic. The mechanic told him there is a serious issue with the car that may cause him to lose control of it. A week later, the car still hasn't been fixed because the shop was closed all week and it is the only one that can do the job.	Sean is a father with three kids who he drives to school every day. Noticing his car was acting up recently, he took it into a mechanic. The mechanic told him there is a serious issue with the car that may cause him to lose control of it. A week later, the car still hasn't been fixed because Sean is lazy and doesn't care to get it fixed quickly.	What is the likelihood Sean's kids will be injured in car accident on their way to school?
Expired food	Jasmine was invited to attend a company dinner party tonight with her co-workers and is rushing to get ready. Each employee was asked to bring their own dessert to share. After finding a recipe online, Jasmine decided to make a custard pie. While making the custard, she noticed that the milk she used is past its expiration date. Since there is no time to fix it and she doesn't want to show up empty-handed, she	Jasmine was invited to attend a company dinner party tonight with her co-workers and is rushing to get ready. Each employee was asked to bring their own dessert to share. After finding a recipe online, Jasmine decided to make a custard pie. While making the custard, she unknowingly used milk that is past its expiration date. She brings the pie with her and a few people eat it.	Jasmine was invited to attend a company dinner party tonight with her co-workers and is rushing to get ready. Each employee was asked to bring their own dessert to share. After finding a recipe online, Jasmine decided to make a custard pie. While making the custard, she noticed that the milk she used is past its expiration date. Since she doesn't like her job and finds her co-workers annoying, she brings the pie with	What is the likelihood that one of Jasmine's co-workers who ate the pie will get sick from it?

	brings the pie with her and forewarns her co-workers about the spoiled milk. A few people eat it.		her and does not tell anyone about the spoiled milk. A few people eat it.	
Yellow light	After getting off of work, John realizes that he left his wife's unwrapped anniversary present on the kitchen table at home. Rushing to get there before his wife does, he drives through multiple yellow lights on the way.	After getting off of work, John rushes to get home and drives through multiple yellow lights on the way.	After getting off of work, John realizes that he left his bag of cocaine on the kitchen table at home. Rushing to get there before his wife and kids do, he drives through multiple yellow lights on the way.	What is the likelihood John will be in a car accident on his way home?
Train crossing	Bill is in a hurry to finish his morning run so that he can make it to the soup kitchen in time to serve lunch to the homeless. As he approaches a rail road crossing he sees the arms coming down, signaling an oncoming freight train. Not wanting to wait, he decides to dash across the tracks.	Bill is in a hurry to finish his morning run. As he approaches a rail road crossing he sees the arms coming down, signaling an oncoming freight train. Not wanting to wait, he decides to dash across the tracks.	Bill is in a hurry to finish his morning run so that he can meet with a prostitute while his wife it out doing errands. As he approaches a rail road crossing he sees the arms coming down, signaling an oncoming freight train. Not wanting to wait, he decides to dash across the tracks.	What is the likelihood Bill will be hit by the train?
Quarter	Jason is at an amusement park and decides to go on the Freefall Ride. Before he gets on, the staff ask all riders to remove loose items from their pockets. As the ride reaches the top, Jason realizes there is a quarter in his shirt pocket. He tries his best to hold on to it, but it still flies out of his hand as the ride drops.	Jason is at an amusement park and decides to go on the Freefall Ride. Before he gets on, the staff ask all riders to remove loose items from their pockets. As the ride reaches the top, Jason doesn’t realize he forgot to take a quarter out of his shirt pocket. The quarter flies out of his pocket as the ride drops.	Jason is at an amusement park and decides to go on the Freefall Ride. Before he gets on, the staff ask all riders to remove loose items from their pockets. As the ride reaches the top, Jason realizes there is a quarter in his shirt pocket. Thinking it would be funny to hit someone in the head, he throws the quarter out of his pocket as the ride drops.	What is the likelihood someone walking near the Freefall Ride will be hit by the quarter?