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Effect in Risk Perception**

**Dan M. Kahan
Donald Braman
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Culture and Identity-Protective Cognition: Explaining the White Male Effect in Risk Perception

*Dan M. Kahan, Donald Braman, John Gastil
Paul Slovic, & C.K. Mertz**

Abstract

Why do white men fear various risks less than women and minorities? Known as the “white male effect,” this pattern is well documented but poorly understood. This paper proposes a new explanation: identity-protective cognition. Putting work on the cultural theory of risk together with work on motivated cognition in social psychology suggests that individuals selectively credit and dismiss asserted dangers in a manner supportive of their preferred form of social organization. This dynamic, it is hypothesized, drives the white male effect, which reflects the risk skepticism that hierarchical and individualistic white males display when activities integral to their cultural identities are challenged as harmful. The article presents the results of an 1,800-person study that confirmed that cultural worldviews interact with the impact of gender and race on risk perception in patterns that suggest *cultural*-identity-protective cognition. It also discusses the implication of these findings for risk regulation and communication.

Fear discriminates. Numerous studies show that risk perceptions are skewed across gender and race: women worry more than men, and minorities more than whites, about myriad dangers—from environmental pollution to hand guns, from blood transfusions to red meat (Bord & Connor, 1997; Brody, 1984; Davidson & Freudenburg, 1996; Flynn, Slovic, & Mertz, 1994; Gutteling & Wiegman, 1993;

* Dan M. Kahan, Yale Law School. Donald Braman, George Washington Law School. John Gastil, University of Washington, Department of Communications. Paul Slovic, University of Oregon and Decision Research. C.K. Mertz, Decision Research. Address correspondence to Dan M. Kahan (dan.kahan@yale.edu), Yale Law School, PO Box 208215, New Haven, Connecticut, 06520.

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Jones, 1998; Kalof, Dietz, Stern, & Guagnano, 2002; Mohai & Bryant, 1998; Satterfield, Motz & Slovic, 2004; Steger & Witt, 1989; Stern, Dietz & Kalof, 1993).

To date, no compelling account has been offered of why risk perceptions vary in this way. It is not convincing to suggest that women and minorities have less access to, or understanding of, scientific information about risk. Gender and race differences persist even after controlling for education. Indeed, gender variance exists even among scientists who specialize in risk assessment (Barke, Jenkins-Smith & Slovic, 1997; Kraus, Malmors & Slovic, 1992; Slovic, 1999).

Also unsatisfying is the suggestion that women are more sensitive to risk because of their role as caregivers. This argument not only fails to explain variance across race, but also cannot account for the relative uniformity of risk assessments among women and African-American *men*, who presumably are no more socially or biologically disposed to be caring than are white men (Flynn et al., 1994).

Women and African-Americans feel less politically empowered than white men and have less confidence in government authorities. These perceptions might incline them to feel more vulnerable to dangers generally. Research shows that such attitudes do play a role, but that both gender and race continue to predict risk perceptions even after these factors are taken into account (Satterfield et al., 2004).

In this article, we consider a new explanation. Previous studies have found that race and gender differences in risk perception can be attributed to a discrete class of highly risk-skeptical white men (Flynn et al., 1994). The distorting influence of this seemingly fearless group of men on the distribution of risk perceptions has been referred to as the “white male effect” (Finucane, Slovic, Mertz, Flynn, & Satterfield, 2000b). Research also has shown that these men are more likely to hold certain anti-egalitarian and individualistic attitudes than members of the general population (Finucane et al., 2000b; Palmer, 2003). This finding suggests that the white male effect might derive from a congeniality between hierarchical and individualistic worldviews, on the one hand, and a posture of extreme risk skepticism, on the other.

We designed a study to test hypothesis. Our findings strongly support the conclusion that the white male effect is an artifact of variance in cultural worldviews. Across various types of hazards, gender and race *per se* did not influence risk perception among the members of our large and broadly representa-

tive sample. Rather these characteristics influenced risk perception only in conjunction with distinctive worldviews that themselves feature either gender or race differentiation or both in social roles involving putatively dangerous activities.

Indeed, the results of this study complicate the conventional account of who is best described as *fearful* and who *fearless* in this setting. We find that individuals are disposed selectively to accept or dismiss risk claims in a manner that expresses their cultural values. It is natural for individuals to adopt a posture of extreme skepticism, in particular, when charges of societal danger are leveled at activities integral to social roles constructed by their cultural commitments. The *insensitivity to risk* reflected in the white male effect can thus be seen as a defensive response to a form of *cultural identity threat* that afflicts hierarchical and individualistic white males.

But white individualistic and hierarchical males are by no means uniquely vulnerable to this condition. Other groups, including women and African Americans as well as white men holding egalitarian and communitarian worldviews, also face cultural-identity threats that generate distinctive patterns of risk perception. Indeed, the impact of risk regulation on competing understandings of culture and identity helps to explain why the highly technical problems this body of law addresses tend to provoke such impassioned and divisive political conflict (Slovic, 1999).

Our study makes it possible to chart the impact of culturally grounded identity threats on a variety of risk perceptions. We begin in Part I with a discussion of the theory that informs the study. In Part II, we present a description of the study design, and in Part III a detailed description of its results. In Part IV, we summarize our principal findings and discuss their implications for the study of risk perception and the regulation of risk. Part V concludes.

I. Theoretical Background: Culture, Risk, and Identity Threat

We propose that variance in risk perceptions—across persons generally, and across race and gender in particular—reflects a form of *motivated cognition* through which people seek to deflect threats to identities they hold, and roles they occupy, by virtue of contested cultural norms. This proposition derives

from the convergence of two sets of theories, one relating to the impact of culture on risk perception and the other on the influence of group membership on cognition.

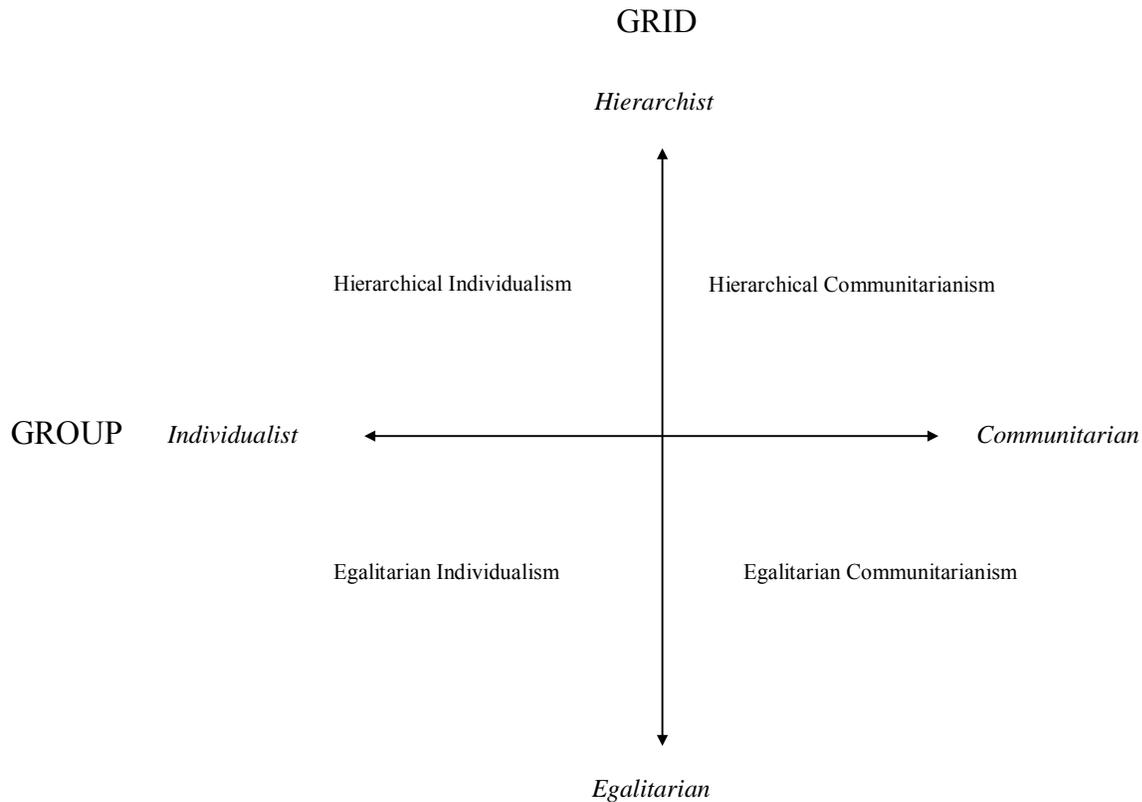
A. The Cultural Theory of Risk

The *cultural theory of risk perception* (Douglas & Wildavsky, 1982; Rayner, 1992) asserts that individuals' perceptions of risk reflect and reinforce their commitments to visions of how society should be organized. Individuals, according to the theory, selectively credit and dismiss claims of societal danger based on whether the putatively hazardous activity is one that defies or instead conforms to their cultural norms. Debates that on the surface feature instrumental, and often highly technical, claims of risk and benefit are in essence "the product of an ongoing debate about the ideal society" (Douglas & Wildavsky 1982, p. 36).

The competing positions at stake in this debate are reflected in Mary Douglas's (1970) "group-grid" typology, which classifies competing sets of norms, or "worldviews," along two cross-cutting dimensions (Figure 1). The "group" dimension represents the degree to which "the individual's life is absorbed in and sustained by group membership" (Douglas, 1982, p. 202). Those with a low group or *individualistic* orientation expect individuals to "fend for themselves and therefore tend to be competitive"; those with a high group or *communitarian* worldview assume that individuals will "interact frequently . . . in a wide range of activities" in which they must "depend on one another," a condition that "promotes values of solidarity" (Rayner, 1992, p. 86). The "grid" dimension measures the pervasiveness and significance of social differentiation within a worldview. Persons who have a high grid or *hierarchical* orientation expect resources, opportunities, respect and the like to be "distributed on the basis of explicit public social classifications, such as sex, color, . . . holding a bureaucratic office, [or] descent in a senior clan or lineage" (Gross & Rayner, 1985, p. 6). Low grid orientations value "an *egalitarian* state of affairs in which no one is prevented from participating in any social role because he or she is the wrong sex, or is too old, or does have the right family connections" and so forth (Rayner, 1992, p. 86). Groups of like-minded persons, moreover, typically form within the interior of the quadrants demarcated by the intersection of group and grid, thereby becoming committed to social arrangements that combine elements of ei-

ther “hierarchy” or “egalitarianism,” on the one and, with either “individualism” or “communitarianism,” on the other (Douglas, 1982; Thompson, Ellis, & Wildavsky, 1990).

Figure 1: “Group-Grid” Worldview Typology



These preferences, cultural theory posits, explain political conflict over risk regulation. Persons who are relatively egalitarian and communitarian are naturally sensitive to environmental and technological risks, the reduction of which justifies regulating commercial activities that produce social inequality and legitimize unconstrained self-interest. Those who are more individualistic predictably dismiss claims of environmental risk as specious, in line with their commitment to the autonomy of markets and other private orderings. So do relatively hierarchical persons, who perceive assertions of environmental catastrophe as threatening the competence of social and governmental elites (Douglas & Wildavsky, 1982; Wildavsky & Dake, 1990). Building on Douglas’s and Wildavsky’s work, numerous empirical studies have shown that perceptions (lay and expert) of various types of environmental and technological hazards

do vary in patterns that conform to these (Dake, 1991; Ellis & Thompson, 1997; Gyawali, 1999; Jenkins-Smith & Smith, 1994; Jenkins-Smith 2001; Marris, Langford & Langford O’Riordan, 1998; Peters & Slovic, 1996; Steg & Sievers, 2000; Poortinga, Steg & Vlec, 2002; Wildavsky & Dake, 1990).

B. Identity-Protective Cognition

Group membership, it has been shown, “can affect how people process information about nearly all categories of stimuli in the social world” (Baumeister & Leary, 1995, p. 504). Individuals tend to adopt the beliefs common to members of salient “in-groups.” They also resist revision of those beliefs in the face of contrary factual information, particularly when that information originates from “out group” sources, who are likely to be perceived as less knowledgeable and less trustworthy than “in group” ones (Mackie & Quellar, 2000; Clark & Maas, 1988; Mackie, Gastardoconaco & Skelly, 1992).

Identity-protective cognition is one proposed mechanism for this set of dynamics. Individual well-being, this account recognizes, is intricately bound up with group membership, which supplies individuals not only with material benefits but a range of critical nonmaterial ones including opportunities to acquire status and self-esteem. Challenges to commonly held group *beliefs* can undermine a person’s well-being either by threatening to drive a wedge between that person and other group members, by interfering with important practices within the group, or by impugning the social competence (and thus the esteem-conferring capacity) of a group generally. Accordingly, as a means of identity self-defense, individuals conform their appraisals of information in a manner that buttresses beliefs associated with belonging to particular groups (Cohen, Aronson & Steele, 2000; Cohen, 2003; Cohen, Sherman, Bastardi, Hsu, McGoey & Ross, in press).

The existence of identity-protective cognition is most convincingly supported by studies that investigate how group membership interacts with diverse forms of reasoning. Even someone whose sense of worth was *not* invested in any profound way in group membership might treat the views of those he associates with and trusts as a rough indicator of the accuracy of a commonly held belief. But experimental studies show the impact of group membership on belief formation is not confined to this heuristic one; the perceived predominance of a belief within a group influences information processing *even* when a member of that group uses systematic reasoning, which is characterized by a relatively high degree of

deliberate, critical analysis (Cohen, 2003). In effect, an unself-conscious desire to affirm group beliefs *motivates* both heuristic and systematic reasoning, determining which form a person will employ and to what end. The motivational effect of group membership on information processing is most easily explained by the inference that individuals *do* have a profound emotional and psychic investment in seeing their groups beliefs confirmed (Giner-Sorolla & Chaiken, 1997; Chen, Duckworth & Chaiken, 1999).

C. Synthesis: *Cultural*-Identity-Protective Risk Perception

At least as a matter of theory, a marriage of the cultural theory of risk and identity-protective cognition would seem to confer benefits on both. The latter supplies the former with something it notoriously lacks: a straightforward account of why individuals form the beliefs associated with the group-grid culture types. Douglas (1986) and other cultural theorists (Thompson, Ellis & Wildavsky, 1990) have suggested functionalist explanations that assume individuals adopt beliefs congenial to the groups to which they belong precisely because their holding such beliefs promotes their groups' interests. By supplying a psychological mechanism rooted in individuals' perceptions of their own interests, identity-protective cognition extricates cultural theory from the well known difficulties that plague functionalist accounts (Boudon, 1998; Balkin, 1998, pp. 176-80).

The cultural theory of risk, in turn, supplies a vivid and realistic picture of the types of groups and associated beliefs likely to generate identity-protective forms of cognition. In the laboratory, in-group effects on cognition can be elicited on the basis of seemingly peripheral or even wholly contrived groups and with respect to wholly inconsequential issues. But in the real-world we associate with myriad diverse groups: we are disciples of religions and members of health clubs; practitioners of professions and devotees of professional sports teams; citizens of nation states and residents of neighborhoods. It's not merely implausible but logically impossible for persons to react with identity-protective cognition with respect to all the beliefs that might predominate among all such groups, whose (often shifting) majorities are bound to disagree with one another on particular issues.

"Group-grid" furnishes a parsimonious typology of highly salient commitments that are likely to shape individuals' identities, and determine their group-based affinities, in a manner that transcends the scores of associations they might happen to form with like- and unlike-minded persons. The established

empirical correlation between membership in cultural groups of these types and beliefs on societal risks constitutes a fertile testing ground for hypotheses about the contribution identity-motivated cognition is making to real-world conflict on issues of tremendous consequence.

Among such hypotheses are ones that relate to gender and racial variance in perceptions of risk. It's possible that these characteristics predict some level of agreement about societal dangers because they tend to correlate with the identity-generative outlooks represented in the group-grid scheme. In that case, we should expect to see demographic variation in risk perception largely dissipate once individuals' cultural worldviews are taken into account.

But even once worldviews are controlled for, we might still see race or gender differences of a distinctively cultural nature. Particular sets of cultural norms are likely to feature greater degrees of gender and race differentiation in social roles than are others. For example, because hierarchical norms explicitly tie obligations and entitlements, goods and offices, to conspicuous and largely immutable characteristics such as "kinship, race, gender, age, and so forth" (Rayner, 1992, p. 86), those norms are more likely than egalitarian ones to distinguish the sorts of activities that are esteem-conferring and otherwise appropriate for men and women, minorities and whites. Where such role differentiation exists, the occasion for identity-protective forms of risk-skepticism or risk-receptivity will vary across gender and race *within* culturally defined groups, depending on whose cultural identity—men's or women's, whites' or minorities' —is being enabled or interfered with by some putatively dangerous activity. If sufficiently pronounced, this type of *cultural-identity*-protective cognition would resolve the mystery of the "white male effect" in risk perception.

III. Study Design

A. Overview

To test these conjectures about the relationship between cultural worldviews, identity-protective cognition, and demographic variance in risk perception, we conducted a large-scale opinion survey. The

sample consisted of 1,844 United States residents, 18 years of age or older, contacted by random-digit-dialing to participate in a telephone interview.¹ To ensure a sample large enough to facilitate meaningful assessment of the relative effects of cultural worldviews across persons of diverse races, the study included an oversample of 242 African-Americans, the group whose risk perceptions we expected to diverge most from that of whites.² As described in more detail below, information was collected on our subjects' perceptions of various types of societal risks, their cultural worldviews, and various other individual characteristics.

The basic premise of the study was that the distribution of risk perceptions across persons can yield insight about the formation of those perceptions. One prominent position asserts that individuals (in aggregate, and over time) process information in a manner consistent with expected utility (Viscusi, 1983). An opposing view holds that individuals systematically misprocess risk information as a result of cognitive limits and biases (Sunstein, 2005). These theories generate different predictions about the influences that determine risk perception, but neither predicts that cultural worldviews will be one of them: there's no reason to think that hierarchs and individualists have more or less access to information about risk than do egalitarians and communitarians, or that one or the other of these types is more bounded in its rationality. If it turns out, then, that perceptions of risk do in fact strongly correlate with individuals' worldviews even after other pertinent individual characteristics are taken into account, that result would supply strong evidence that culture is motivating identity-protective cognition in the way we surmise.

B. Hypotheses

Stated generally, our hypothesis is that cultural-identity-protective cognition will generate two sorts of variance in risk perception. First, individuals holding differing worldviews should disagree with

¹ A summary of the sample characteristics and sampling methods appears as Appendix X.

² Relatively few studies have examined the risk perceptions of distinct minority groups relative to one another. However, one study has found that Taiwanese-American males, like white American males, rate health and technology risks to be low relative to white females, Taiwanese-American females, and African-Americans and Mexican-Americans generally (Palmer, 2003). Finucane *et al.* (2000b) also found that Asian males are more akin to white American males in their perception of certain risks.

one another when their respective norms clash on the value of a putatively dangerous activity. And second, individuals sharing a cultural worldview should diverge along gender or race lines when their shared norms feature gender or race differentiation with respect to social roles involving such an activity. We selected for study three types of risks—environmental, gun-related, and abortion-related—in which this basic hypothesis generated more specific, testable predictions.

1. Environmental Risks

Perceptions of environmental danger are the central phenomena of inquiry for the cultural theory of risk and are well-known to reflect race and gender variance. We hypothesized, consistent with Douglas and Wildavsky (1982), that relatively hierarchal and individualistic worldviews would diminish concern with environmental risks, whereas relatively egalitarian and communitarian worldviews would accentuate it. We predicted the influence of cultural worldviews would be strong relative to other individual characteristics that might influence risk perception, including other potential group bases of identity-protective cognition such as political and religious affiliations.

We also hypothesized that the “white male effect” for environmental risks would derive from variance along the grid or Egalitarianism-Hierarchy dimension of cultural outlook. Within a hierarchical worldview, women are primarily assigned to domestic roles, men to public ones within civil society and within the government. Accordingly, to the extent that assertions of environmental risk are perceived as symbolizing a challenge to the prerogatives and competence of social and governmental elites (Douglas & Wildavsky, 1982), it is *hierarchical men*—and particularly *white* ones, insofar as minorities are more likely to be disproportionately egalitarian in their outlooks—whose identities are the most threatened, and who are thus most likely to form an extremely dismissive posture toward asserted risks.

For persons of an individualist orientation, market roles are likely to be seen as esteem-conferring for both men and women, and for both whites and minorities. Accordingly, the disposition toward an individualist worldview should generate relatively uniform skepticism across gender and race about assertions of danger directed at commercial activities. Likewise, egalitarianism and communitarianism should generate relatively uniform concern about environmental and technological risks.

2. Gun Risks

The gun-control debate can be framed as one between competing risk claims. Control proponents argue that too little control increases the risk of gun violence and accidents (e.g., Cook & Ludwig, 2000), whereas control opponents argue that too much control risks depriving innocent persons of the ability to defend themselves from violent criminals (e.g., Lott, 2000).

We hypothesized that which of these risks individuals find more important would turn on their cultural orientation. Persons of hierarchical and individualistic orientations should be expected to worry more about being rendered defenseless because of the association of guns with hierarchical social roles (hunter, protector, father) and with hierarchical and individualistic virtues (courage, honor, chivalry, self-reliance, prowess). Relatively egalitarian and communitarian respondents should worry more about gun violence because of the association of guns with patriarchy and racism and with distrust of and indifference to the well-being of strangers (Kahan & Braman, 2003). Again, we predicted that these influences would be large relative to those of other individual characteristics, including affiliations that might generate identity-protective cognition.

It is well documented that men and whites view guns more favorably than do women and African-Americans (e.g., Smith, 2000). We hypothesized that this “white male effect,” too, would derive from differences in cultural orientation. The social roles that guns enable and the virtues they symbolize are stereotypically *male* roles and virtues (Buckner, 1994). Moreover, “in the historic system of the South, having a gun was a white prerogative,” making gun ownership an enduring “symbol of white male status” in particular (Hofstadter, 1970, p. 84). Accordingly, it is individualistic and hierarchical white males whose identities are threatened most by regulation of guns and who should therefore form the most skeptical attitude about asserted gun risks. Hierarchical and individualistic worldviews should, we hypothesized, produce relatively *less* skepticism among women and minorities, because they have less of an identity investment in guns being freely available. Because egalitarianism and communitarianism don’t tie antipathy to guns to race and gender roles, those worldviews should uniformly incline whites and minorities, men and women, toward gun-risk sensitivity.

3. Abortion Risks

Hierarchical and individualistic white men are not the only cultural subgroups facing threats to their status. Hierarchical women are experiencing a similar challenge as norms conferring status on women who successfully occupy professional roles have come to compete with and perhaps overtake traditional patriarchal norms that assign status to women for occupying domestic roles. This, according to Luker (1984), is the status conflict that informs political dispute over abortion, the free availability of which is thought to symbolize the ascent of egalitarian and individualist norms over hierarchical ones that celebrate motherhood as the most virtuous social role for women.

We predicted that these culturally grounded disagreements would generate identity-protective cognition on the health risks of abortion, an issue that has emerged as central to the rationale for a new generation of abortion regulations (Siegel, 2007).³ Conforming their factual beliefs to their cultural commitments, relatively hierarchical individuals, we hypothesized, would see abortion as more risky than persons who are relatively egalitarian and individualistic. Moreover, because they are the ones whose identities are most threatened by abortion's symbolic denigration of motherhood, *hierarchical women*, we anticipated, would be the most receptive of all to the claim that abortion is dangerous; all else equal, commitment to hierarchical norms, we predicted, would have a less dramatic impact in accentuating the abortion-risk concerns of men. In addition, because egalitarian and individualistic norms confer status to women as well as men who master professional roles, the disposition toward those worldviews, we surmised, should uniformly incline women and men to the view that abortion is in fact safe. We also anticipated that any race effect on abortion risk perceptions would originate in either the correlation of race with cultural outlooks or an interaction between race and cultural worldviews.

³ The U.S. Supreme Court in fact cited the government's legitimate interest in protecting women from "[s]evere depression and loss of esteem" as a ground for upholding the federal partial-birth abortion law (Gonzales v. Carhart, 127 S. Ct. 1610, 1634 (2007)).

C. Measures

1. Cultural Worldviews

The survey contained 32 worldview items (see Appendix B), consisting of statements to which respondents indicated their level of agreement or disagreement on a four-point scale. Item development consisted of the adaptation of items used in previous studies based on the cultural theory of risk (including Dake, 1991; Ellis & Thompson, 1997; Jenkins-Smith, 1996; Peters & Slovic, 1996), as well as the creation of new items based on focus-group discussions and survey pretesting.

The statements were intended to form (and did form) two reliable scales: Communitarianism-Individualism ($\alpha = .77$), which is patterned on the group dimension of the Douglas typology; and Egalitarianism-Hierarchy ($\alpha = .81$), which is patterned on the grid dimension. The Communitarianism-Individualism scale measured concern for individual versus collective interests (e.g., “The government should do more to advance society’s goals, even if that means limiting the freedom and choices of individuals”), as well as how responsibility for meeting individual needs should be allocated between individuals and the community (e.g., “Too many people today expect society to do things for them that they should be doing for themselves”). The Egalitarianism-Hierarchy scale measured attitudes toward group stratification (e.g., “We have gone too far in pushing equal rights in this country”) and toward deviance from dominant norms and roles (e.g., “It’s old-fashioned and wrong to think that one culture’s set of values is better than any other culture’s way of seeing the world.”). We computed continuous worldview scores (“Individualism” and “Hierarchy”) by averaging the items for each scale, with high scores indicating a more individualistic and a more hierarchical orientation, respectively.

To facilitate analysis, we also assigned individual respondents to cultural groups. We thus designated respondents as either “Hierarchs” or “Egalitarians,” and as either “Individualists” or “Communitarians,” depending on the relationship of their scores and the median score on each scale. Consistent with the expectation that coherent groups tend to form in the quadrants delineated by the group-grid framework (Douglas, 1982; Thompson, Ellis, & Wildavsky, 1990), we classified respondents as either “Hierar-

chical Individualists,” “Hierarchical Communitarians,” “Egalitarian Individualists,” or “Egalitarian Communitarians” depending on where their scores lie in relation to the median scores of both scales.

2. Other Individual Characteristics

In addition to soliciting respondents’ gender, race, and age, the survey collected data on other individual characteristics that have been found to correlate with risk perceptions. These include demographic characteristics such as education level, household income, and the type of community in which respondents reside. They also include a general predilection for risk taking, which we measured with a two-item “sensation-seeking” scale (“Sensation-Seeking”) that has been shown to be a strong and reliable predictor of individuals’ propensity to engage in personally hazardous behavior (Stephenson, Hoyle, Palmgreen, & Slater, 2003).

We also collected information on other group affiliations that might be viewed as supplying alternative bases of identity-protective cognition. Respondents were thus asked to report their religious affiliations. They were also asked to characterize their political views on a conventional seven-point ideology scale (“Conservative”) ranging from “extremely liberal” to “extremely conservative.” Finally, they identified their party affiliation, if any, and rated its intensity on a 5-point scale (“Democrat”) ranging from “strong Republican” to “strong Democrat.”

3. Risk Perception

a. *Environmental risk perceptions.* The survey solicited evaluations of three putative environmental risks: nuclear power generation, global warming, and environmental pollution generally (see item wording in Appendix). Participants rated their perception of these risks on a four-point scale based on how strongly they agreed or disagreed that the risk in question was serious. Responses were averaged to form a single environmental-risk perception scale ($\alpha = .72$), with higher scores indicating greater concern about environmental risks.

b. *Gun-risk perceptions.* Those involved in the gun debate disagree about the relative magnitude of the risks associated with insufficient and excessive regulation of guns. Accordingly, to test their perceptions of these competing risks, respondents indicated their level of agreement or disagreement with

opposing statements about the impact of guns in either promoting or undermining personal and societal safety. Because risk evaluations are also frequently qualitative and not just quantitative in nature (Slovic et al., 1979), respondents were also asked to react to opposing “dreadedness” items: one asked them to relate how disturbing they found the prospect that they or a loved one might be injured or killed as a result of insufficiently strict gun control laws; the other asked them to relate how disturbing they found the prospect that overly strict gun control laws might interfere with their use of firearms to defend themselves or loved ones from attack (see Appendix). The items were combined into a scale ($\alpha = .83$), with higher scores indicating greater concern that gun ownership on net reduces public safety.

c. *Abortion risk perception.* We measured respondents perceptions of the risk of obtaining an abortion by asking them to state the strength of their agreement or disagreement with the proposition, “Women who get abortions are putting their health in danger.”

D. Statistical Methods

1. Tests

We anticipated performing a series of statistical analyses for each type of risk perception. Preliminary analysis would consist of the comparison of group means to determine the distribution of risk perceptions across demographic and cultural groups. The primary analyses would consist of multivariate regression tests aimed at measuring the influence of cultural worldviews on risk perceptions controlling for other influences.

To test the hypothesized culture-specificity of race and gender variance, we anticipated using multivariate regression analysis to determine whether gender and race *interact* with cultural worldviews and the extent to which such interactions explain the white male effect. Accordingly, we constructed a series of interaction variables, which were computed by multiplying respondents’ gender and race scores by their cultural orientation scale scores (e.g., “Female_x_Hierarchy,” “Black_x_Individualism”). We also constructed a set of dummy variables (e.g., “Hierarchical White Male,” coded “1” for Hierarchical white males and “0” for all other respondents) to be used to measure the extent to which gender and race variation within the sample as a whole could be attributed to the extreme views of particular groups.

2. Power

Because we hypothesized that gender and gender variance would be culture specific, we anticipated testing for the *absence* of significant demographic variance after appropriately controlling for cultural worldviews and related interaction effects. Our sample of 1,844 respondents had sufficient statistical power to detect small effect sizes (*e.g.*, $r = .10$) at a significance criterion of .01 in all anticipated multivariate regression analyses (Cohen, 1988). Accordingly, nonsignificance findings in these analyses are not properly attributed to Type II error (Streiner, 2003). Subsample size varied considerably for group means comparisons, but was generally sufficient to detect moderate effect sizes ($d \geq .5$) at a two-tailed significance level of .05.

3. Missing Data

Missing data were imputed through multiple imputation with Stata using the MICE (multivariate imputation by chained equations) module (Royston, 2004). Five imputed data sets were generated. The data were combined and analyzed based on the formulae presented in King *et al.* (2001), and Rubin (1987).

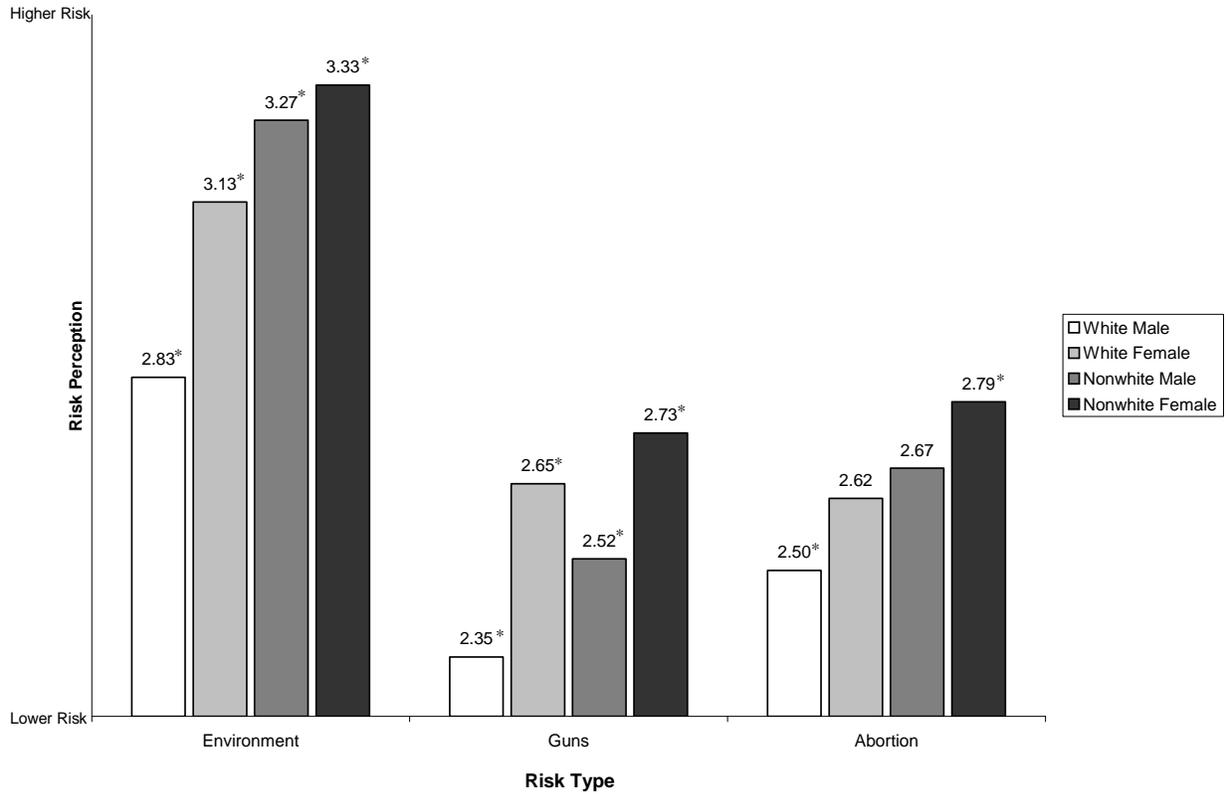
IV. Results

We present the results of the study in two general steps. First, we report raw means for risk perceptions based on demographic characteristics, worldviews, and combinations of the two. Second, to enable testing of study hypotheses, we report a set of multivariate regression analyses that enable us to assess the relative and interactive effect of culture and other individual characteristics for each type of risk perception.

A. Preliminary Analysis: Comparison of Mean Risk Perceptions

Our sample displayed the conventional “white male effect” (Figure 2). White males were significantly less concerned about each risk evaluated in the study. The relative concerns of white females and male and female nonwhites varied across risks.

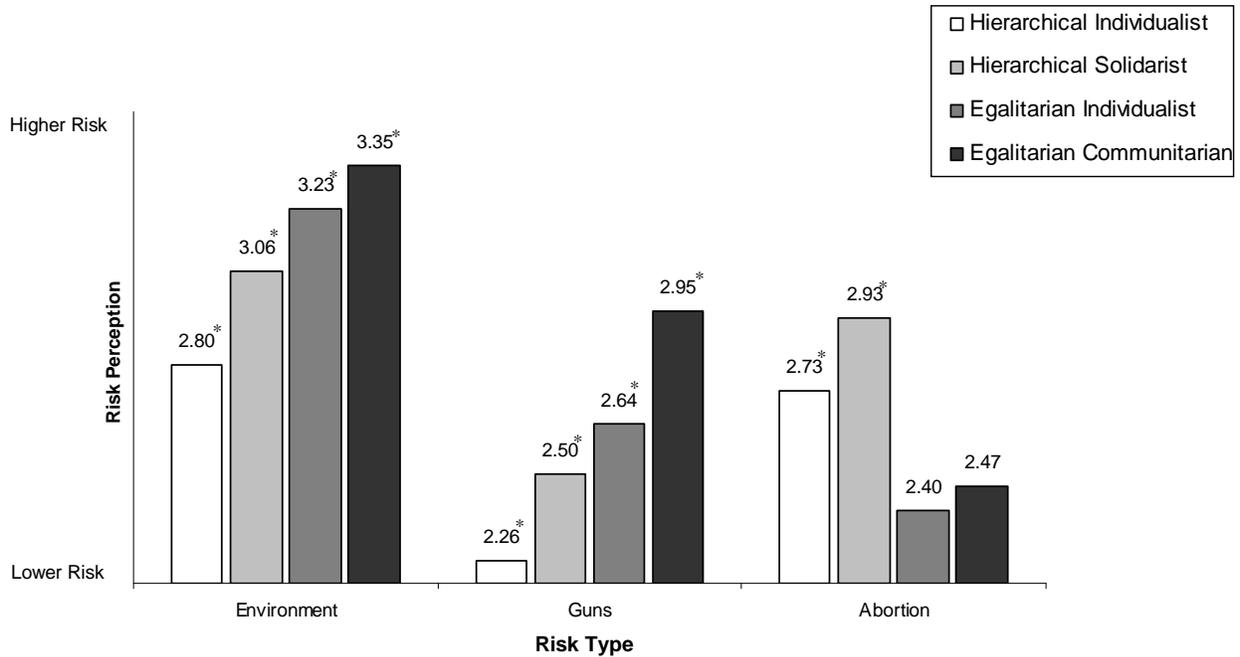
Figure 2: “White Male Effect” on Risk Perceptions



N = 1844. * Denotes significant difference ($p \leq .05$), as determined by *t*-test, between indicated group and all other groups for relevant risk type.

There was also a clear cultural effect (Figure 3). As expected, persons who held relative hierarchical and individualistic outlooks—and particularly both simultaneously—were the least concerned about environmental risks and gun risks, while persons who held relatively egalitarian and communitarian views were most concerned. With regard to abortion risks, in contrast, persons who were both relatively hierarchical and communitarian in their views were most concerned; individuals who had an egalitarian outlook, particularly those who qualified as Egalitarian Individualists, were least worried about the risk of abortion for women’s health. This pattern, too, conformed to the anticipated influence of group-grid cultural dispositions.

Figure 3: Cultural Worldview Effect on Risk Perceptions



N = 1844. * Denotes significant difference ($p \leq .05$), as determined by *t*-test, between indicated group and all other groups for relevant risk type.

When risk-perceptions were examined for groups defined by combinations of demographic characteristics and cultural worldviews, the “white male effect” turned out to be highly culture specific (Table 1, Figure 4).⁴ The difference between the mean risk perceptions of white men those of white females and minorities was pronounced among persons subscribing to hierarchical worldviews for each of the risks examined. For individualists, differences in the perceptions of white males and others were pronounced for every risk but abortion. Differences in the perceptions of white males and others for all risks were relatively muted among persons holding egalitarian and communitarian worldviews and were nonsignificant with respect to gun risks and abortion risks.

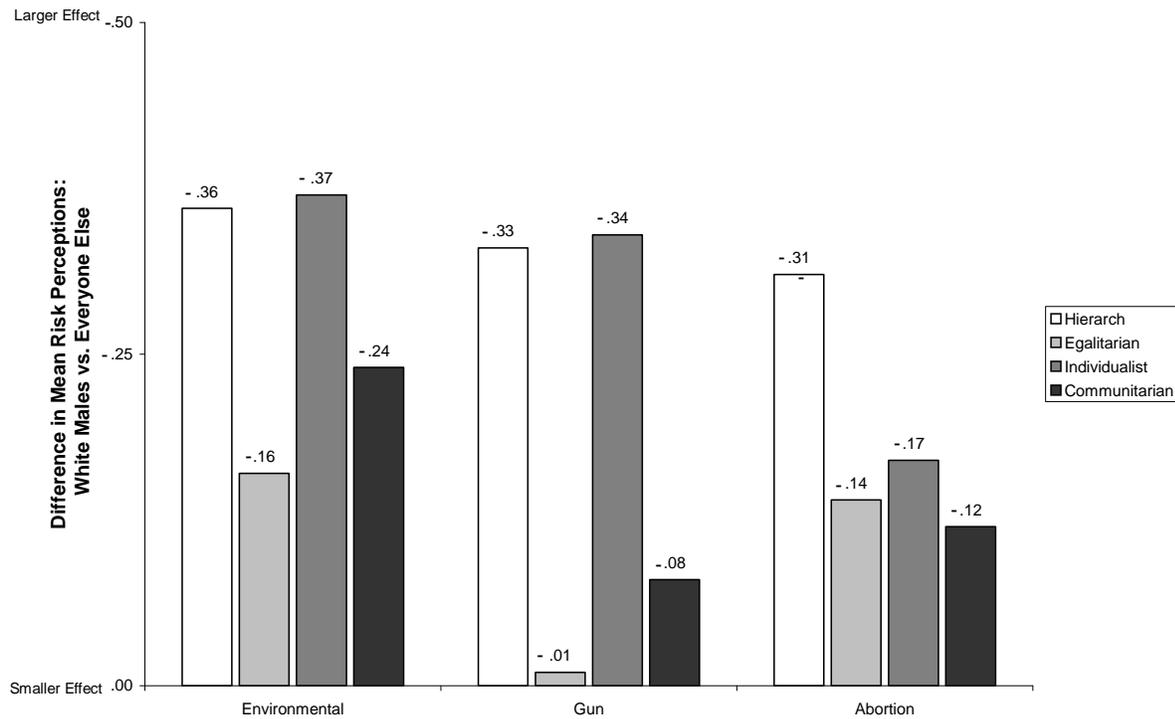
⁴ The African-American oversample was excluded from this analysis to avoid overweighting the perceptions of African-Americans relative to white women and other minorities in computing the means for individuals in the “everyone else” category.

Table 1: Mean Risk Perceptions of White Males and Everyone Else within Cultural Groups

	<i>Environmental Risks</i>		<i>Gun Risks</i>		<i>Abortion Risks</i>	
	<i>White Males</i>	<i>Everyone Else</i>	<i>White Males</i>	<i>Everyone Else</i>	<i>White Males</i>	<i>Everyone Else</i>
Hierarch	2.66	3.02* [†]	2.13	2.47* [†]	2.61	2.92* [†]
Egalitarian	3.18	3.33* [†]	2.80	2.81	2.27	2.41 [†]
Individualist	2.73	3.10* [†]	2.19	2.53* [†]	2.49	2.66*
Communitarian	3.05	3.29* [†]	2.72	2.80	2.52	2.64

N = 1,602 (oversample excluded). Bold font indicates that the white male cultural group differs significantly ($p \leq .01$) from the opposing white male cultural group. For “everyone else,” * denotes a significant difference ($p \leq .05$) with white males of the same cultural group; [†] denotes a significant difference ($p \leq .05$) with “everyone else” of the opposed cultural group.

Figure 4: Size of “White Male Effect” on Risk Perception Across Cultural Groups



These patterns are suggestive of the hypothesized interaction of the white male effect with culture-specific forms of identity-protective cognition. But for definitive testing, it is necessary to disentangle the influences of demographic characteristics and cultural outlooks through multivariate regression analyses.

B. Multivariate Regression Analyses

1. Environmental Risks

The regression analyses for environmental risk perceptions are reported in Table 2. Model 1 regresses on environmental risk perceptions a set of individual characteristics—including race, gender, age, household income, tastes for risk taking (Sensation Seeking), and political ideology and affiliation—that might be expected to affect environmental risk perception. Model 2 adds the cultural worldviews variables. Each worldview variable was significant and had the predicted sign. That is, the more hierarchical and individualistic respondents’ worldviews became, the less seriously they took putative environmental risks; and the more egalitarian and communitarian their worldview, the more concerned they were.

Table 2: Environmental Risk Perception Regression Models

<i>Model</i>	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>
Female	.143***	.106***	-.046**	.035
Black	.063***	.032	.029	.021
Other Minority	.054**	.042**	.041**	.016
Age	-.078***	-.059***	-.060***	-.064***
Income	-.014	-.011	-.010	-.009
Education	-.018	-.066***	-.064***	-.035*
Sensation Seeking	-.022	-.019	-.016	-.010
Rural	-.028	-.015	-.015	-.018
Suburban	-.034	-.033	-.037*	-.036*
Jewish	.033	.028	.030	.030
Catholic	.049**	.046**	.045**	.046**
Other Nonprotestant Religion	.020	.015	.014	.017
No Religion	.050**	.015	.014	.034*
Conservative	-.142***	-.045*	-.043*	-.107***
Democrat	.187***	.121***	.123***	.161***
Individualism		-.078***	-.068***	-.118***
Hierarchy		-.182***	-.158***	
Female_x_Hierarchy			.041**	
Female_x_Individualism			.028	
Hierarchical White Male				-.117***
R ²	.23	.28	.28	.26

N = 1844. Dependent variable is Gun Risk Perception. Coefficients are semi-partial correlation coefficients. *** $p \leq .01$, ** $p \leq .05$, * $p \leq .10$.

Adding Individualism and Hierarchy increased the explanatory power of Model 2 by approximately 20%. Hierarchy had the single largest effect of any independent variable, and the combined effect of the two worldview variables explained over nine times as much variance as education, and over three times as much as gender. These results are consistent with the hypothesized influence of identity-protective cognition on environmental risk perceptions. Moreover, the combined effect of the cultural worldview variables also dwarfed that of other group-identity related variables that might be expected to support identity-protective cognition, including political party affiliation and ideology, which when combined explained less than one-half as much variance as did cultural worldviews, and religious affiliations, which were of relatively minor consequence.⁵

⁵ Coefficients for the religious affiliation dummy variables reflect their effect relative to Protestantism.

Model 2 is also suggestive of the contribution that cultural worldviews make to explaining demographic variance in risk perception. Indeed, the significant influence of being African-American on risk perception disappeared once cultural orientation was taken into account. In other words, race variance in environmental risk perceptions was attributable to the disproportionately egalitarian and communitarian worldviews of African-Americans.

Gender remained a significant predictor after cultural worldviews were taken into account. This result, however, risks obscuring a more subtle relationship between gender and cultural orientation. Our hypothesis was that the influence of gender on environmental risk perception is an artifact of differentiation in roles specific to a hierarchical cultural orientation. The regression reported in Model 2 could mask such an effect because it assesses the impact of gender on environmental risk perceptions when cultural worldviews are held constant at their means. If sufficiently large, gender variation specific *only* to persons of a hierarchical orientation could produce the misleading appearance of a generalized gender effect within the whole sample (Aiken & West, 1991).

Accordingly, we examined whether the impact of gender on environmental risk perceptions was, in fact, conditional on individuals' cultural orientations. Model 3 adds the gender-culture interaction variables. The significance of Female_x_Hierarchy shows that there was an interaction between gender and the grid or Egalitarianism-Hierarchy dimension of worldview. In other words, variance along this dimension of worldview did *not* exert the same influence on men's and women's respective perceptions of environmental risk. Rather, as the positive coefficient associated with Female_x_Hierarchy conveys (Aiken & West, 1991; Jaccard & Potter, 1998), women discounted environmental risk *less* than men as their respective orientations became more hierarchical. Consistent with our hypothesis, the nonsignificance of Female_x_Individualism suggests that the impact of a progressively individualistic worldview on environmental risk perception cannot be confidently said to differ by gender.

Model 4, the final regression model in Table 2, evaluates precisely how much of a contribution the risk-skepticism associated with being a white hierarchical males make to the gender and race variance observed in the sample as a whole. Model 4 adds a dummy variable for white hierarchical males. As a result, the coefficient for Female in Model 4 represents the impact of being female, and the coefficient for

Black the impact of being African-American, and the coefficient for Other Minority the impact of being another racial minority on the environmental risk perceptions of *all male Egalitarians* (individualistic as well as communitarian) and *all women* (irrespective of cultural orientation), holding all other influences constant (Aiken & West, 1991; Hardy, 1993). Those coefficients were not significant. This result confirms that the white male effect for environmental risks observed in the sample as a whole was, as hypothesized, attributable in its entirety to the extreme risk skepticism that hierarchical commitments induce in white males.

2. Gun Risks

Table 3 reports the regression analyses used to assess the relative contribution of cultural world-views and other individual characteristics on gun-risk perceptions. Models 1-2 enter independent variables in steps to assess their independence and relative explanatory power. Model 1 shows that gender and race both predicted the perception that guns are dangerous, as did being Jewish or Catholic, and degree of education, whereas both residing in an rural (as opposed an urban) environment and a taste for risk-taking predicted the perception that guns are safe. Model 2 adds political ideology and party affiliation: not surprisingly, conservatism predicted the belief that guns are safe, while Democratic party affiliation predicted the belief that guns are dangerous. Indeed, the effect sizes of these variables were relatively large and completely subsumed the effects associated with race in Model 1.

Table 3: Gun-Risk Perception Regression Models

<i>Model</i>	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>6</i>
Female	.218***	.186***	.134***	-.037**	.033
Black	.081***	-.010	-.055***	-.062***	-.061***
Other Minority	.059***	.019	.003	-.004	-.035*
Age	.037*	.024	.060***	.059***	.034*
Income	.024	.036*	.040**	.039**	.035*
Education	.138***	.112***	.051***	.057***	.106***
Sensation Seeking	-.058***	-.072***	-.059***	-.058***	-.060***
Rural	-.11 ***	-.093***	-.072***	-.070***	-.090***
Suburban	.018	.030	.031*	.023	.027
Jewish	.102***	.075***	.068***	.064***	.070***
Catholic	.074***	.046**	.042**	.042**	.044**
No Religion	.131***	.050**	.006	-.003	.038*
Other Religion	.063***	.038*	.034*	.026	.035*
Conservative		.128***	.041**	.031	.115***
Democrat		-.179***	-.050**	-.039*	-.155***
Individualism			-.218***	-.126***	
Hierarchy			-.204***	-.198***	
Female_x_Individualism				.002	
Female_x_Hierarchy				.066***	
Black_x_Hierarchy				.088***	
Black_x_Individualism				-.004	
Otherminority_x_Hierarchy				.035*	
Otherminority_x_Individualism				-.018	
Female_x_Black				-.003	
Female_x_Otherminority				-.025	
Female_x_Hierarchy_x_Black				-.044**	
Female_x_Hierarchy_Otherminority				-.018	
Female_x_individualism_x_Black				.034*	
Female_x_Individualism_x_Otherminority				.037**	
Hierarchical White Male					-.090***
Individualistic White Male					-.078***
R ²	.14	.24	.37	.39	.27

N = 1844. Dependent variable is Gun Risk Perception. Coefficients are semi-partial correlation coefficients. *** $p \leq .01$, ** $p \leq .05$, * $p \leq .10$.

Model 3 adds the cultural worldview variables. As predicted, egalitarian and communitarian worldviews predicted the belief that guns are dangerous, while hierarchical and individualistic worldviews predicted the belief that guns are safe.

Together the worldview measures increased the explanatory power of Model 2 by over 50%. Hierarchy and Individualism have the first and second largest effect sizes, respectively, of all the independent variables. When combined, they explain almost 5 times as much variance as gender, 34 times as much as education, and 17 times as much as residing in a rural environment. They explained 20 times as much

as party affiliation and ideology when combined, and 10 times as much as the religious affiliation variables when combined. Again, the results strongly supported the hypothesis that cultural worldviews exert a strong identity-protective influence on cognition.

Intriguingly, being African-American reemerged as a weak but significant influence in Model 4. However, its sign had flipped, indicating that being African-American weakly predicted the perception that guns are *safe* once cultural orientation was taken into account. Because it stands the effect of Black observed in Model 1 on its head, this result strikingly confirms that the difference between African-Americans and whites overall derived from the disproportionate commitment of African-Americans to egalitarian and communitarian worldviews.

Model 5 tests for significant interactions between demographic characteristics and cultural worldviews. There were significant (or borderline significant: $p = .07$ for Female_x_Individualism_x_Black) three-way interactions between gender, the cultural orientation variables, and Black, and between gender, individualism, and Other Minority. In other words (or simply in words), these results show, consistent with our hypotheses, that increasing hierarchical and individualistic worldviews induce greater risk-skepticism in *white males* than in either white women or male or female nonwhites. This effect is illustrated graphically in Figures 5 and 6.

Figure 5: Interaction of Egalitarianism-Hierarchy with Gender and Race on Gun-Risk Perceptions

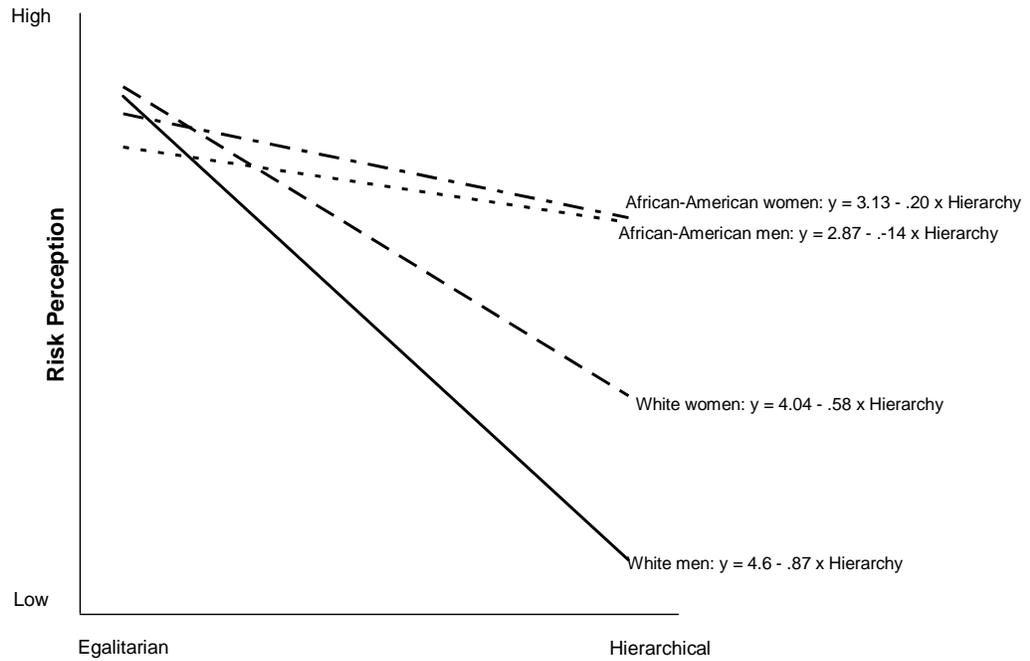
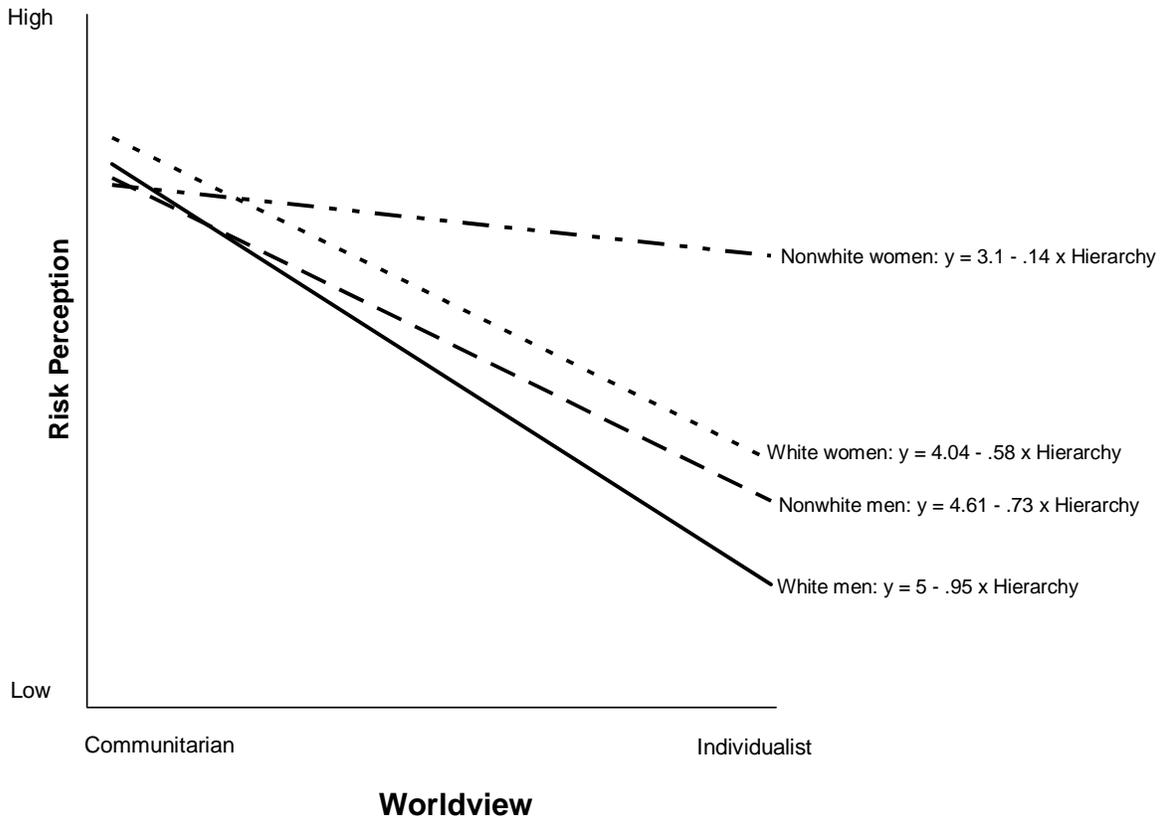


Figure 6: Interaction of Communitarianism-Individualism with Gender and Race on Gun-Risk Perceptions



Model 6 in Table 3 assesses exactly how much of the race and gender variance observed in the sample as a whole can be attributed to white individualistic and hierarchical men. The model adds to the array of independent variables included in Model 2 dummy variables for hierarchical white males and individualistic white males. As a result, Female, Black, and Other Minority now represent the effect, respectively, of being a woman, being African-American, and being another racial minority on the gun-risk perceptions of *all* women and minorities and *all* white male Egalitarian Communitarians. The coefficient for Female is nonsignificant. The coefficients for Black and Other Minority are significant but have negative signs, indicating that being a minority correlates with viewing guns as *more* safe once the effect of being a hierarchical white or individualistic male is controlled for. These results support the hypothesis that the white male effect with respect to gun risks on the whole is attributable to the extreme impact of hierarchical and individualistic worldviews on white males, who can be expected to adopt a posture of identity-defensive risk skepticism by virtue of the importance of guns for their cultural roles.

3. Abortion Risks

Table 4 reports our regression analyses of abortion-risk perceptions. Model 1 uses an array of individual characteristics as independent variables, and Model 2 adds cultural worldviews. Consistent with our hypotheses, Model 2 shows that respondents became more concerned about abortion risks as their worldviews became more hierarchical, and less concerned as their worldviews became more individualistic.

Together, the cultural orientation scales added approximately 10% to the explanatory power of the model. Their combined effect size is nearly five times that of education, almost double that of the combined effect of party affiliation and ideology, and over that of religious affiliations when combined. (Not surprisingly (Sullins, 1999), relative to Protestantism Catholicism did not significantly predict greater perception of abortion risk.). Again, these results support the hypothesis that cultural worldviews exert a strong identity-protective influence on cognition.

Table 4: Abortion Risk Perception Models

<i>Model</i>	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>6</i>
Female	.042**	.053***	-.045**	-.052***	-.014
Black	.125***	.135***	.133***	-.034*	.142***
Other Minority	.026	.031	.030	-.018	.043*
Age	-.083***	-.083***	-.083***	-.083***	-.081***
Income	-.075***	-.072***	-.071***	-.071***	-.068***
Education	-.112***	-.084***	-.082***	-.081***	-.108***
Rural	.005	.004	.004	.003	.005
Suburban	-.033	-.032	-.036*	-.038**	-.036**
Sensation Seeking	-.048**	-.039*	-.036*	-.037*	-.037**
Jewish	-.040*	-.037*	-.035*	-.035*	-.037**
Catholic	.014	.014	.013	.014	.015
Other Religion	-.045**	-.042**	-.043**	-.043**	-.042
No Religion	-.131***	-.107***	-.108***	-.109***	-.126***
Conservative	.187	.124***	.125***	.124***	.177***
Democrat	-.094***	-.062***	-.060***	-.059***	-.081***
Individualism		-.105***	-.081***	-.088***	-.065***
Hierarchy		.150***	.081***	.063***	
Female_x_Hierarchy			.041**	.050***	
Female_x_Individualism			.021	.020	
Female_x_Black				.035**	
Female_x_Otherminority				.006	
Other Minority_x_Hierarchy				.024	
Black_x_Hierarchy				.001	
Black_x_Individualism				.032*	
Otherminority_x_Individualism				.023	
Female_x_Hierarchy_x_Black				-.032*	
Female_x_Hierarchy_x_Otherminority				-.009	
Hierarchical White Female					.098***
R ²	.21	.23	.24	.24	.21

N = 1844. Dependent variable is Abortion Risk Perception. Coefficients are semi-partial correlation coefficients. *** $p \leq .01$, ** $p \leq .05$, * $p \leq .10$.

Being a woman remained a significant predictor of higher levels of concern about abortion risks, as did being African-American, once worldviews were taken into account in Model 2. Interaction variables were again added to investigate whether these effects are conditional on cultural worldviews.

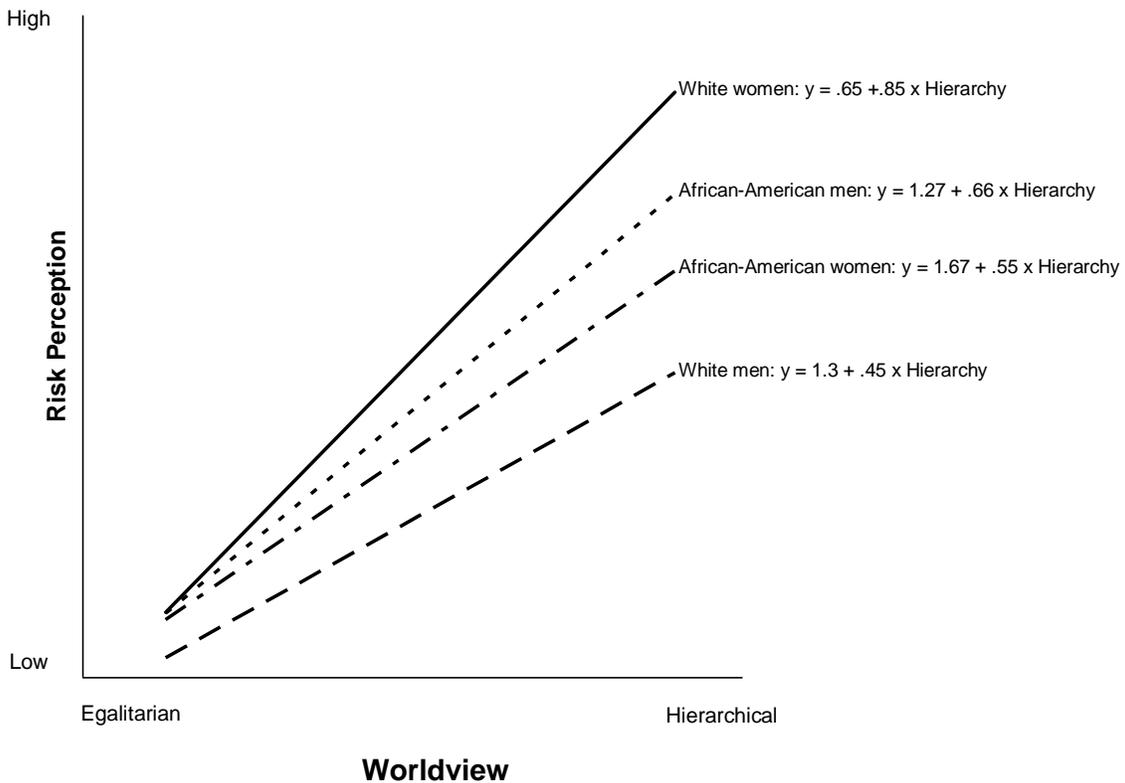
As shown in Model 3, Female_x_Hierarchy was statistically significant, confirming that gender interacted with the grid or Egalitarianism-Hierarchy dimension of worldview. The positive coefficient associated with that variable indicated that as their respective worldviews became more hierarchical, female respondents became more concerned about abortion risks than did male respondents. This result is

consistent with the hypothesis that identity-protective concerns would induce abortion risk-concern in particular among hierarchical women.

We also predicted that individualistic women would not experience any greater identity-protective effect on abortion risk perceptions than individualistic men. Consistent with this hypothesis, the coefficient for Female_x_Individualism is nonsignificant ($p = .314$).

Model 4 discloses a borderline significant ($p = .07$) three-way interaction: Female_x_Hierarchy_x_Black. Figure 7 illustrates the nature of this effect: variation along the Hierarchy-Egalitarian dimension of cultural worldview affects white women more dramatically than it does white men or African-American men or women.

Figure 7: Interaction of Egalitarianism-Hierarchy with Gender and Race on Abortion-Risk Perceptions



A final regression analysis examines how much of the gender and race variance observed in the sample can be attributed to the extreme risk-sensitivity of white hierarchical females. In Model 4, we

added the dummy variable Hierarchical White Female. In the resulting regression formula, the coefficient for Female measured the impact of gender, and Black the impact of being African-American, on the abortion-risk perceptions of egalitarian women and of all minority women and all men, irrespective of cultural worldview, holding all other influences constant. As the table shows, Female was nonsignificant. This result, consistent with our hypothesis, confirms that all of the gender-related variance in the sample was attributable to the extreme risk sensitivity associated with being a white female Hierarch. Black, however, remained statistically significant, confirming, contrary to expectations, that being an African-American heightens concern about abortion risks independent of cultural worldviews.

IV. Discussion

A. Summary of Key Findings

Our study was designed to see if the “white male effect” could be explained as a form of motivated cognition aimed at protecting identities individuals form through their commitment to cultural norms. The results strongly suggest that it can.

Each type of risk perception had the hypothesized relationship with cultural worldviews. Egalitarian and communitarian worldviews predicted risk-sensitivity, hierarchical and individualistic worldviews risk-skepticism, toward environmental risks. Abortion-risk sensitivity, in contrast, grew in proportion to respondents’ commitment to a hierarchical worldview but receded in proportion to their commitment to an individualistic as well as an egalitarian one. Which type of gun risks alarmed respondents most also depended on cultural orientation: the more egalitarian and communitarian respondents became, the more concerned they were that insufficient regulation would lead to gun accidents and crime, whereas the more hierarchal and individualistic they became the more worried they were that excessive regulation would undermine the ability of law-abiding persons to defend themselves from violent law-breakers. These effects were all large, moreover, relative to that of other individual characteristics that might be thought to bear on risk perception, including other group affiliations (such as political party affiliation and religion) that might be expected to produce identity-protective cognition.

Demographic variance in risk perceptions, we found, grew out of cultural variance. Gender affects risk perception only in conjunction with particular worldviews. The influence of gender on both en-

vironmental and abortion-risk concerns is conditional on holding a relatively hierarchical outlook. Similarly, being male predicts less fear of gun risks conditional on holding either a hierarchical or an individualistic worldview. Racial disparities were also highly dependent on culture. When cultural orientations were controlled for, being African-American no longer displayed greater apprehension about either environmental risks or gun risks.

The impact of cultural worldviews is consistent with the hypothesized relationship between risk perception and cultural-identity-protective cognition. In keeping with the association of gun ownership with hierarchical and individualistic norms, for example, respondents who held hierarchical and individualistic worldviews were predictably disposed to reject the assertion — leveled by their egalitarian and communitarian rivals — that guns are dangerous. The respondents inclined to see guns as safest of all were hierarchical and individualistic *white men*. Their stance of fearlessness is convincingly attributable to identity-protective cognition insofar as they are the persons who need guns the most in order to occupy social roles and display individual virtues within their cultural communities.

Identity-protective cognition also plausibly explains the white male effect for environmental risk perception. All of the gender and race variance with respect to this attitude, we found, was attributable to hierarchical white men. Their extreme risk skepticism makes sense under the cultural theory of risk perception, since their identity is threatened by the indictment of societal and governmental elites implicit in the claim that commerce is hazardous (Douglas & Wildavsky, 1982). Hierarchical women are less threatened, and thus less risk skeptical, because their identity is tied to domestic roles. Assertions of environmental risk should pose an identity challenge to relatively individualistic persons, who equate success in the market with personal virtue. But as we hypothesized, because individualistic norms treat commercial and professional roles as status-enhancing for both men and women, an individualistic orientation disposed respondents to risk skepticism without regard to gender. Our data also demonstrated that male and female African Americans were uniformly receptive to environmental risk claims — and no more so than whites once cultural orientation was controlled for.

White hierarchical and individualistic males are by no means the only persons for whom identity threats generate distinctive risk perceptions. Hierarchy more powerfully disposed white women to perceive danger in abortion. We hypothesized that hierarchical women would be more risk-sensitive insofar as abortion rights are perceived to denigrate hierarchical norms that confer status on women for occupying domestic rather than professional roles.

B. Outstanding Issues and Questions

1. Experimental Follow-ups

We have supported our central hypotheses by presenting evidence that risk perceptions are distributed across persons in patterns that are most convincingly explained by cultural-identity-protective cognition. This is, however, an admittedly indirect form of proof. Future research could corroborate the conclusions of this study through experimental methods. Supporting evidence for the phenomenon of identity-protective cognition generally, for example, includes experiments that show that resistance to information that challenges beliefs dominant within subjects' groups can be *negated* through interventions that *affirm* subjects' sense of self-esteem, and in particular that affirm that subjects' group-based identity (Cohen, 2003; Cohen *et al.*, in press). Similar experiments could be designed to examine the effect of *cultural-identity affirmation* on the processing of information that otherwise runs contrary to beliefs dominant within the groups defined by Douglas's group-grid scheme.

The mode of proof used in this study also does not rule out the possibility that alternative or supplemental mechanisms of cognition are also contributing to the impact of cultural worldviews on individual risk perceptions. One likely candidate is affect. The visceral responses that putatively dangerous activities trigger have been shown to be the strongest and most robust predictors of perceived risk (Slovic, Finucane, Peters & MacGregor 2004; Finucane, Alhakami, Slovic, & Johnson, 2000a; Loewenstein, Weber, Hsee, & Welch, 2001). Because emotions are shaped by social norms (Nussbaum, 2001), we would anticipate that whether affective responses of this sort bear a negative or positive valence depends on one's cultural worldview.

Additional mechanisms might also mediate the impact of culture on risk perception. These include: *biased assimilation* (Lord, Ross & Leper, 1979), which might induce them to credit or discredit

factual information in a manner supportive of their prior, culturally grounded views (Kahan, Slovic, Braman, Gastil & Cohen, 2007); *availability bias* (Tversky & Kahneman, 1973; Slovic, 1976), which might be expected to interact with worldviews if individuals are disposed more readily to take note of and recall instances of harm that comport with their culturally conditioned expectations (Kahan & Braman, 2003); and various in-group and out-group dynamics, such as *naïve realism* (Robinson, Keltner, Ward, & Ross, 1995), *reactive devaluation* (Ross, 1995), and *group polarization* (Sunstein, 2002), which might motivate individuals to trust those who share their cultural allegiances and distrust those who do not when cultural groups disagree about risk.

The influence of these processes in explaining the connection between cultural worldviews and risk perception is also fully amenable to experimental study. Appropriate investigations could be expected to yield an integrated account of how a form of “cultural cognition” explains differences of opinion on issues of fact more generally (DiMaggio, 1997; Douglas, 1999).

2. African-American Abortion Risk Perceptions

The primary anomalous finding was the strong relationship between race and abortion risk perception. There no interaction between hierarchical worldviews and gender for African-Americans, and African-Americans on the whole see abortion as more dangerous than whites even after cultural orientation is taken into account.

One possible explanation is that the perception of abortion risk might be identity protective for egalitarian African men and women in a way that it isn't for egalitarian whites. Scholars have amply documented the behaviors that African Americans feel impelled to use to parry stigmatizing depictions of them (Braman, 2004). Research on “stereotype threat” finds that individual African Americans, to head off discriminatory treatment, will conspicuously disavow attitudes associated with their race (Steele & Aaronson, 1995, 2002). The “politics of respectability” refers to the collective tendency of African Americans to adopt certain socially conservative positions in order to rebut the perception that they are uncommitted to or “[in]capable of meeting the established moral standards of white middle-class Americans” (Kennedy, 1999, p. 17).

Such standards include conventional sexual and family norms: monogamy, sex only within marriage, the two-parent household. Prevalent racial stereotypes depict African-Americans as unfit to meet these expectations (Smith, 1990; Siegelman & Tuch, 1997). Thus, notwithstanding their egalitarianism—on the contrary, precisely because of it—African-Americans might affirm patriarchal norms as a means of fighting these stereotypes. In particular, because the relatively high rate of abortion among African-Americans reinforces the stigmatizing depictions of them as sexually irresponsible, the same interest in attacking racial stereotypes would explain why African Americans are more pro-life than whites who hold egalitarian values (Combs & Welch, 1982; Wilcox, 1990). Disposed by identity-protective concerns to denounce abortion as immoral, African-Americans might be disposed to form a view of the danger of abortion that that bolsters their cultural evaluation of it.

This account is obviously conjectural. Whether African-Americans are subject to distinctive identity-protective influences on cognition than are experienced by whites—particularly whites of a highly egalitarian worldview—is a matter that merits additional investigation.

C. Some Practical Implications

Our findings have important practical implications. The connection between risk perceptions and cultural worldviews should influence both the regulation and the communication of risk.⁶

1. Risk Regulation

Normally risk regulators use risk-benefit or related forms of analysis to evaluate hazardous activities and proposed measures for abating them (e.g., Revesz, 1999). When employing this approach, analysts often take as given public assessments of the benefits associated with putatively dangerous activities, as revealed in market transactions and other forms of private behavior (Viscusi, 1983). However, many analysts propose discounting public evaluations of the risks associated with such activities on the ground

⁶ For more systematic discussions of the normative and prescriptive significance of the influence of cultural worldviews on perceptions of risk, see Kahan, Slovic, Braman & Gastil (2006), and Kahan & Braman (2006).

that those judgments are likely to be distorted by cognitive biases or errors to which experienced risk experts are less likely to succumb (e.g., Margolis, 1996; Sunstein, 2005; Breyer, 1993).

Our study complicates this strategy for risk regulation. To start, the relationship between cultural worldviews and risk perceptions blurs the line between public assessments of the “risks” and “benefits” of putatively dangerous activities. The cultural theory of risk perception suggests that individuals conform their view of how dangerous an activity is to their moral assessment of it. Accordingly, when expert risk regulators dismiss public estimations of various *risks* as uninformed, they can just as easily be understood to be discounting the *benefits* that individuals attach to activities by virtue of their cultural worldviews.

At the same time, our findings cast doubt on the usual assumption that regulators should always credit the value members of the public attach to hazardous activities. The law takes public estimations of the benefits of dangerous activities as given on the liberal democratic ground that no person’s valuation of safety relative to other goals is entitled to more or less weight than anyone else’s. But once the connection between risk perception and cultural worldviews is exposed, it becomes clear that individual tolerance of danger does not reflect a “safety” preference in any straightforward sense. In selecting some risks for attention and dismissing others as unimportant, individuals are, effectively, advancing one culturally partisan vision of the ideal society over others (Kahan, in press). It is unclear that risk regulation policy should be responsive to such demands. One might argue, for example, that the law should repudiate the low environmental risk evaluations reflected in the “white male effect” not simply because those evaluations are erroneous, but because they express inappropriate hierarchical and individualistic norms. Alternatively, one might oppose, say, the demand for stricter forms of gun control on the ground that it derives not from an acceptable desire for personal safety but from an illiberal desire to erect an egalitarian or communitarian orthodoxy in law. We take no position on these issues here; we merely draw attention to the normative complexities that a cultural theory of risk perception reveals.

2. Risk Communication

The implications of our study for risk communication are more straightforward. The influence of cultural worldviews on risk perception demonstrates that it would be a profound mistake to assume that the simple ascertainment and dissemination of empirical truth will lead to public enlightenment on vari-

ous societal and personal risks. Where the activities associated with those risks are conspicuously emblematic of one cultural worldview or another, identity-protective cognition will induce individuals to credit or dismiss scientific information depending on its congeniality to their cultural norms.

This conclusion does not necessarily mean, however, that it is impossible to educate the public about the risks of such activities. What it does imply is that information must be transmitted in a form that makes individuals' acceptance of it compatible with their core cultural commitments. It is not enough that the information be true; it must be framed in a manner that bears an acceptable social meaning.

In this respect, experimental work on *identity-affirmation* and cognition is particularly apt. Researchers have shown that individuals who are either personally affirmed or exposed to group-affirming stimuli thereafter display less bias when processing information that is contrary to beliefs dominantly held by their peers (Cohen, 2000; Sherman & Cohen, 2002; Cohen *et al.*, in press). Identifying conditions of information dissemination that would exploit this effect in the context of real-world policy debates would enable citizens of diverse cultural persuasions to converge on facts that bear on their common welfare (Kahan *et al.*, 2006).

Evidence of the sort we have presented in this paper will be highly useful to risk communicators intent on employing this type of strategy. By identifying the cultural worldviews of those most disposed to process risk information in an identity-protective fashion, our study would furnish the risk communicator with information relevant to crafting an appeal that affirms rather than denigrates recipients' values.

V. Conclusion

Our aim in this study was to investigate the origins of variance in risk perception, particularly racial and gender variance. The source of it, we hypothesized and our data support, is a form of motivated cognition aimed at protecting persons' cultural identities. As surmised by Douglas and Wildavsky (1982), individuals tend to conform their view of the risks of putatively dangerous activities — commerce and technology, guns, abortion — to their cultural evaluations of them. Because individuals' identities are threatened when they encounter information that challenges beliefs commonly held within their group

(Cohen *et al.*, in press), the result is political conflict over risk regulation among groups committed to opposing hierarchical and egalitarian, individualistic and communitarian worldviews.

Similar dynamics explain gender and race disparities in risk perception. Different ways of life feature distinctive forms of gender and racial differentiation in social roles involving putatively dangerous activities. Accordingly, men and women, whites and minorities, form distinct attitudes toward risk in a manner that protects from interference the activities on which their identities depends.

The data we have presented have important practical implications. Normatively, our data raise difficult questions about whether and how identity-protective attitudes toward risk should be factored into the social-welfare calculus that guides risk regulators. Prescriptively, our data suggests the need for expressively sophisticated modes of risk communication, one that avoid identity-protective resistance to public acceptance of empirically sound risk information.

Fear does discriminate. But it does so in a more even-handed way than had been previously realized. Women and minorities are more fearful of various risks. But the reason they are is that men, particularly individualistic and hierarchical white ones, tend to be more fearful of threat to their identities that would occur were the law to accept that activities essential these individuals' identities are dangerous and worthy of regulation. White hierarchical and individualistic men are not the only ones, moreover, impelled toward extreme stances toward risk by identity-protective cognition. The phenomenon is ubiquitous.

These findings solve many long-standing theoretical puzzles about the nature and significance of variance in risk perception. But they also expose a host of new practical and moral challenges for reconciling the rational regulation of risk with democratic decisionmaking.

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Appendix A. Sample Characteristics and Sampling Methods

The sample consisted of 1,844 United States residents 18 years of age or older. Subjects were contacted in a nationwide, random-digit-dial telephone survey conducted between June and September, 2004, by the firm Northwest Survey and Data. To facilitate investigation of racial variance in risk perception, the sample contained an African-American oversample of 242 persons. Overall, there were 519 white male subjects, 707 white female subjects, 153 black male subjects, and 254 black female subjects. The mean age was 39. The average household income was between \$40,000 and \$50,000. The average interview length was approximately 21 minutes. Conservatively estimated, the survey response rate was 42%, and the cooperation rate was 59%, which means that roughly six-in-ten of those identified as eligible respondents completed the survey.

Appendix B. Survey Items

All of the items shown below used a four-point response scale: 1 = strongly agree, 2 = agree, 3 = disagree, and 4 = strongly disagree.

A. Cultural World View Items

1. *Egalitarianism-Hierarchy Scale*. Items beginning with “E” are reversed.

HCHEATS	It seems like the criminals and welfare cheats get all the breaks, while the average citizen picks up the tab.
HEQUAL	We have gone too far in pushing equal rights in this country.
HFEMININ	Society as a whole has become too soft and feminine.
HREVDIS1	Nowadays it seems like there is just as much discrimination against whites as there is against blacks.
HREVDIS2	It seems like blacks, women, homosexuals and other groups don't want equal rights, they want special rights just for them.
HTRADFAM	A lot of problems in our society today come from the decline in the traditional family, where the man works and the woman stays home.
HWMNRTS	The women's rights movement has gone too far.
EDISCRIM	Discrimination against minorities is still a very serious problem in our society.
EDIVERS	It's old-fashioned and wrong to think that one culture's set of values is better than any other culture's way of seeing the world.
EGAYMAR	A gay or lesbian couple should have just as much right to marry as any other couple.
ERADEQ	We need to dramatically reduce inequalities between the rich and the poor, whites and people of color, and men and women.
EROUGH	Parents should encourage young boys to be more sensitive and less “rough and tough.”

EWEALTH	Our society would be better off if the distribution of wealth was more equal.
EXSEXIST	We live in a sexist society that is fundamentally set up to discriminate against women.

2. *Communitarianism-Individualism Scale*. Items beginning with “S” are reversed.

IENJOY	People who are successful in business have a right to enjoy their wealth as they see fit.
IFIX	If the government spent less time trying to fix everyone’s problems, we’d all be a lot better off.
IGOVWAST	Government regulations are almost always a waste of everyone’s time and money.
IINTRFER	The government interferes far too much in our everyday lives.
IMKT	Free markets--not government programs--are the best way to supply people with the things they need.
INEEDS	Too many people today expect society to do things for them that they should be doing for themselves.
INEEDY	It’s a mistake to ask society to help every person in need.
IPRIVACY	The government should stop telling people how to live their lives.
IProfit	Private profit is the main motive for hard work.
IPROTECT	It’s not the government’s business to try to protect people from themselves.
IRESPON	Society works best when it lets individuals take responsibility for their own lives without telling them what to do.
ITRIES	Our government tries to do too many things for too many people. We should just let people take care of themselves.

SHARM	Sometimes government needs to make laws that keep people from hurting themselves.
SLIMCHOI	Government should put limits on the choices individuals can make so they don't get in the way of what's good for society.
SNEEDS	It's society's responsibility to make sure everyone's basic needs are met.
SPROTECT	The government should do more to advance society's goals, even if that means limiting the freedom and choices of individuals.
SRELY	People should be able to rely on the government for help when they need it.

B. Risk Perception Items

1. Environmental Risks

ENVIRON	Environmental pollution is a serious risk to public health in our country.
GLOBWARM	Global warming poses a serious danger for the future of our planet.
NUKES	It is dangerous to live near a nuclear power plant.

2. Gun Risks

HOMEACC	When people keep a gun in their home, there is a serious risk that someone will be accidentally shot.
HOMEDDEF	Keeping a gun in the home is an effective way for those who live there to defend themselves from an intruder. (Reversed)
SOCSAFE	The more guns there are in our society, the less safe our society becomes.
HANDCRIM	Fewer people commit violent crimes when private citizens are allowed to carry concealed handguns. (Reversed)
DREAD1	I am very disturbed by the thought that I or my loved ones might be injured or killed because gun-control laws aren't strict enough.
DREAD2	I am very disturbed by the thought that gun-control laws might interfere with my ability to defend myself or my loved ones. (Reversed)

3. Abortion Risks

ABORTION Women who get abortions are putting their health in danger.