



Exploring the gender gap and the impact of residential location on environmental risk tolerance



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ABSTRACT

To explore the effects of the gender gap and differences in residential location on environmental risk tolerance, we analyze data from the US general population and from households living within 50 miles of a US nuclear facility. We hypothesize that a potentially hazardous facility in close proximity to a residential community generates a constant risk signal that conditions and desensitizes that local population, causing the gender gap to converge and causing overall higher risk tolerance levels. We find support for this “context matters” hypothesis, i.e., that in environmentally stressed communities, the gender gap does converge, and males and females exhibit approximately equal levels of risk tolerance greater than those in non-stressed communities. We conclude that when modeling environmental risk tolerance both gender and place of residence should be considered potentially meaningful explanatory variables.

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1. Introduction

A gender gap is the difference between the attitudes, interests, or preferences of men and women in a given context. In this article, we explore the gender gap effect on environmental risk tolerance. In that context, the gender gap predicts that men will experience and report greater risk tolerance than women (Bord & O'Connor, 1997). However, when, instead of a general population sample, respondents are sampled in neighborhoods that may be considered “stressed” due to their proximity to a known potential environmental hazard, studies have found that the gender gap closes (Greenberg & Schneider, 1995).

Our focus, then, is how environmental risk tolerance is affected by two main factors: the gender gap and residential location. With respect to the former, Davidson and Freudenburg suggested that “[t]he study of environmental risk concerns... provides an important context for the quantitative analysis of the gender difference” (1996, at 305). To the latter, as recently as 2009, Baxter argued that risk is “best understood in the everyday contexts in which [it is] experienced and that place is an understudied, yet important, determinant of risk perception” (Baxter, 2009, at 771 citing Masuda & Garvin (2006); *italics in original*). Davidson and Freudenburg further

observed that while the “socialization process is often treated as a universal phenomenon... the assumptions underlying this formulation are culturally relative...” (1996, at 304–305). To that point, a more recent study suggested that in Sweden, where gender bias is relatively minor due to male/female equality in economic and social domains, the gap is not found (Olofsson & Rashid, 2011a). These three considerations form the framework of our study.

Empirically, the gender gap is generally accepted in many contexts, particularly politics, general employment earnings and career advancement, and achievement in the worlds of science, mathematics, and technology. Our study of the gender gap in environmental risk tolerance, for both the general population and for residents of stressed communities, is motivated by published empirical challenges (e.g., Marshall, 2004) together with doubt as to the underlying theoretical explanation. To inform our analysis, we collected data from both the United States general population as well as from respondents living within 50 miles of a nuclear facility across the United States. In the survey instrument that provided our data, we embedded a question order experiment to permit us to manipulate the salience of adverse environmental events; this permitted us to experimentally test the gender gap effect on environmental risk tolerance. We were, then, able to analyze variations in the gender gap using both observed and experimental data across both the general population and among residents of stressed communities.

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We first review and find in the environmental risk analysis literature a direct contradiction between Greenberg and Schneider (1995) and Marshall (2004). The crux of that contradiction is that under the former study, gender differences in risk tolerance found in the general population closed when the sample was drawn from stressed locations. Under the latter study, a gender difference in risk tolerance was not found in the general population, and equivocal support was found that in stressed communities men tolerated risks better than women.

Against that background, we hypothesize that the presence of a potentially hazardous facility in close proximity to a residential community generates a constant risk signal that conditions and desensitizes that population, effectively closing the gender gap. We continue by reviewing the literature on survey research question order and priming effects, detailing our sampling and data collection protocols, and discussing limitations attending our dataset. We then describe our hierarchical ordinal model and the statistical methodology by which we test our hypotheses, and detail our findings, which include a demonstration of the gender gap in environmental risk tolerance in the general population converging in samples drawn from stressed communities. We conclude with a confirmation of our findings that suggest that the convergence in stressed locations is a product of a persistent risk signal that overrides the culturally conditioned gender gap. We end by locating our findings in the context of recent studies from Sweden that explore a theoretical explanation for the gender gap.

2. Literature review and research questions

2.1. The gender gap & location effects in response to environmental risk: the starting point

For these purposes, the environmental risk analysis conversation begins with a 1995 article by Greenberg and Schneider in which they explored “whether gender differences in perception of risk exist among those who live in stressed neighborhoods” (1995, at 505). While recognizing the overwhelming literature supporting the hypothesis that “women are more concerned about environmental risks than men” (1995, at 503, citing 17 supporting sources from 1980 through 1994), these researchers hypothesized that “males and females who actually confront the hazards, not on their television screens or newspapers, but in their neighborhood, will have the same level of concern[, i.e., that b]oth genders’ concerns [about environmental risks] will shift upward” (1995, at 503).

While Greenberg and Schneider (and, in fact, many researchers in this area) pose their research question in terms of “perception of risk,” they express their hypothesis in terms of tolerance, i.e., worry or “level of concern.” As such, if we are to use this study as our starting point, we must first fix terms and confront the distinction between risk perception and risk tolerance. Logically, *risk perception* is a precursor to risk tolerance; in the most succinct expression, risk perception refers to the recognition of risk, while *risk tolerance* implies recognition and, to varying degrees, acceptance or rejection of that risk. More formally, we define risk perception in sociological terms, as “a construction process embedded into and determined by society and culture,” with the process being “an everyday subjective assessment... based on experience and on available information without referring to reliable data...” (Ammann, Dannenmann, & Vulliet, 2006 at 101). We take risk tolerance as the “amount of risk an individual is willing to assume in pursuit of a goal... [which] may be mediated both by the general tendency to risk aversion of the person and the personal value attached to the goal of a particular situation” (Ji, You, Lan, & Yang, 2011).

Greenberg and Schneider hypothesized that proximity to a hazard acted as a moderating variable that caused the risk tolerance

gender gap to close. They suggested that residential proximity to an environmental hazard lead to an everyday risk familiarity that conditioned both men and women with regard to their risk tolerance. In other words, they hypothesized that once residents have become accustomed to a constant risk signal, male and female risk tolerance scores would converge and the gender gap would close.

Using data from the Census Bureau’s American Housing Survey combined with a ten-neighborhood survey taken in environmentally stressed areas of New Jersey and Pennsylvania, Greenberg and Schneider found strong evidence that outcome distributions varied by stressed versus non-stressed locations. From this, they deduced that a relevant consideration in predicting environmental risk response is whether or not the respondent lives in a “stressed neighborhood with multiple hazards, such as landfills and hazardous waste sites, incinerators, chemical plants, airports, major highways, blighted buildings, and crime” (1995, at 503). In sum, they:

replicated previous reports that women are more concerned than men about environmental risks... [but showed that this finding], as hypothesized, was only in good quality neighborhoods. Stressed neighborhood with multiple hazards demonstrated no consistent difference in concern by gender (1995, at 509).

Tentative explanations for the gender gap are wide-ranging. Davidson and Freudenburg extensively reviewed the environmental concern literature and identified five hypotheses designed to explain lower environmental risk tolerance among women: 1) the knowledgeable support hypothesis; 2) the institutional trust hypothesis; 3) the economic salience hypothesis; 4) the safety concerns hypothesis; and 5) the parental roles hypothesis (1996, at 316–326). Each of these, with the exception of the economic salience hypothesis, are predicated on what these scholars term “a pair of assumptions—first, that women are seen as differing from men with respect to a given characteristic; [and] second, the characteristic is argued to have a specified relationship to environmental concern” (1996, at 316).

These authors’ extensive review of the then-extant literature shows the weakest support for the knowledgeable support hypothesis and the strongest support for the safety concerns hypothesis. That hypothesis holds that “health and safety are more salient to women than to men, and... this heightened salience is reflected in higher levels of concern among women than among men about a *given level* of environmental risk (1996, at 323, *italics in original*). The empirical findings supporting this hypothesis reference “a broad range of studies, using a broad range of measurement techniques,” where “women appear to care more about the potentially serious if not often empirically underdetermined threats to the health and safety of their communities and families” (1996, at 328). It is unsettled whether the driver of these empirical conditions is cultural, structural, experiential, or otherwise.

Around the same time the Greenberg and Schneider were extending gender gap analyses to include the moderating variable of proximity to hazards, Flynn, Slovic, and Mertz (1994) detected the eponymously named white male effect, typically signified as the WME. This effect is that white males “perceive a wide range of risks as being significantly lower when compared with white women, as well as [when compared to] both genders from other ethnic groups” (Flynn et al., 1994; Rivers, Arvai, & Slovic, 2010 at 65). In other words, compared to white women and people of color, white males repeatedly demonstrate an increased risk tolerance. While we do not address issues of race and ethnicity in this study, the WME literature illuminates dynamics that bear on a thorough understanding of the empirical presentation of and theoretical explanations for the gender gap.

It is generally accepted that the WME is driven by key in-group characteristics of white males who “generally possess a higher-

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