Journal of Outdoor Recreation and Tourism ∎ (∎∎∎∎) ∎∎∎–∎∎∎

Contents lists available at ScienceDirect

Journal of Outdoor Recreation and Tourism

journal homepage: www.elsevier.com/locate/jort

Gendered decision-making practices in Alaska's dynamic mountain environments? A study of professional mountain guides

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ARTICLE INFO

Article history:
Received 15 March 2015
Received in revised form
12 July 2015
Accepted 26 November 2015

Keywords:
Gender
Decision-making
Heuristics
Avalanche professionals
Guiding

ABSTRACT

Avalanche professionals make dozens of decisions each time they step into the field. The best practices for decision-making in high-risk, dynamic environments are widely researched and discussed in the snow professional community. However, previous research in the leisure and outdoor recreation fields has failed to address the different ways in which male and female guides gather information and make decisions. This exploratory study sought to better understand the influence of an individual's gender identity on their decision-making and risk tolerance. A survey was administered to professional guides on Denali in the 2014 mountaineering season. Respondents answered questions pertaining to the factors that influenced their decision-making and risk tolerance, as well as their perceptions of those qualities in their coworkers. Results show that while there is no statistical difference between the personal risk tolerance levels of male and female Denali guides, but female backcountry partners are perceived to have a lower risk tolerance. This indicates the potential presence of a "gender heuristic trap".

MANAGEMENT IMPLICATIONS

A better understanding of the strengths and weaknesses of common decision making practices among avalanche professionals is crucial for improving their safety. Perceptions about male and female characteristics are problematic if they are not representative of actual behavior in the field. A better understanding of the decision-making practices of professional mountain guides also provide the foundation for the development of avalanche safety initiatives for recreational, non-professional backcountry users.

1. Introduction

A great deal of research has been done to describe decision-making processes of avalanche professionals, including mountaineering rangers, avalanche educators, ski patrollers, and ski guides (Adams, 2005; Stewart-Patterson, 2008, 2014; Atkins & McCammon, 2010; Hendrikx, Johnson, & Southworth, 2013). This study focused on the decision-making practices of mountain guides, whose decisions in high-risk, dynamic environments have daily life-or-death consequences for themselves and their clients. Mountain guides are responsible for the safety and well-being of their clients (whose experience level can range from first-timer to proficient mountaineer) throughout the duration of a climb. On a peak like Denali, this means making decisions about moving a group up or down the mountain, whether individuals are capable of continuing, how likely the group is to encounter dangerous weather or avalanche conditions, and countless other decisions where a poor choice could result in bodily harm or death. Necessitated by a complex and ever-changing environment—challenging terrain at altitude, complicated by the presence of other groups of climbers—these decisions must be made constantly throughout a guide's time in the field. Compounding the importance of the mountain guide's decision-making process is the reality that each decision, however seemingly small, may irrevocably alter the course of the outing.

Due to the potential of serious consequences, best practices for decision-making is a central topic among avalanche professionals. A better understanding of the strengths and weaknesses of common decision practices is crucial for improving safety. Despite the importance of an in-depth understanding of decision practices for improving overall safety, little information exists on the influence of an individual's gender upon their decision-making in the context of outdoor recreation. The lack of interest in examining

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http://dx.doi.org/10.1016/j.jort.2015.11.010
2213-0780/

gender-specific differences in decision-making may in part be due to the historical lack of females in the climbing communities on Denali and beyond. Though the writing of trip reports is not necessarily indicative of the number of trips undertaken by female climbers, it bears noting that women are consistently absent from records of contemporary mountaineering. A review of the *American Alpine Journal*—the annual publication of the American Alpine Club—shows fewer than 5% of trip reports in the last decade have been authored by women. Records of the US National Park Service (NPS) show that female climbers attempting to climb Denali between 1999 and 2012 have never made up more than 13% of the total number of climbers on the peak.

No physiological reason for this participation gap appears to exist (Bhaumik et al. 2004), and phenotypic selection for ability to perform at altitude does not seem to correlate with an individual's sex (Huey, Salisbury, Wang, & Mao, 2007). If biological makeup does not, by necessity, prevent presence in such high-risk, dynamic environments, the historical gender gap in the mountains is apparently more tied to an individual's internal makeup than to a physical self.

It is commonly perceived that in general, men take more and greater risks than women. Harris, Jenkins, & Glaser (2006) sought to understand the reasons behind gendered differences in risk-taking behavior in recreation and found that women were less likely to make risky choices. The authors attributed the observed differences at least in part to individuals' perceived likelihood and severity of negative outcomes; in this case, female subjects were significantly more likely to perceive likely negative outcomes for recreational endeavors. Similarly, Cazenave, Le Scanff, & Woodman (2007) proposed that women engaged in risk-taking sports as professionals—as opposed to recreationally—could be considered models for the prevention of destructive risk-taking behaviors. Still, conflicting views exist as to whether women truly are more risk-averse than men. A 1999 study of investment decisions of men and women took issue with the stereotype of the risk-averse female and found that, while stock portfolios occasionally seemed to support this notion, "no general support of this stereotype" existed (Schubert, Brown, Gysler & Brachinger, 1999, p. 384).

Despite the limited support for differences in risk-taking behavior between male and female mountain guides, anecdotal data on the dynamics of backcountry ski groups made up exclusively of male participants, of female skiers, and of mixed gender collected by Wheeler (2008) seems to suggested the possibility of a "gender heuristic trap." The concept of "heuristic traps" was introduced to the avalanche community by McCammon (2004) and refers to simple decision rules that are widely used in daily decisions (i.e., heuristics; see, e.g., Gigerenzer and Gaissmaier (2011) for a detailed description), but might lead to catastrophic outcomes when applied inappropriately while traveling in avalanche terrain (hence "trap"). Because we use heuristics frequently and they work well most of the time, we are largely unaware of using them, even when making critical decisions. For example, whereas decision responsibilities are commonly given to natural authority figures (e.g., parents, boss, and best skier), it might be inappropriate to do so in avalanche terrain, since an individual's natural authority might not directly correlate to their mountaineering or avalanche safety skills. Because the decision environment in avalanche terrain is highly complex and intuition plays an important role (Stewart-Patterson, 2008, 2014), backcountry users might be particularly susceptible to the misuse of commonly used heuristics. McCammon (2004) identified six heuristic traps—Familiarity, Acceptance, Commitment, Expert Halo, Tracks/Scarcity, and Social Facilitation—which are summarized in the mnemonic "FACETS", which have become a classic in avalanche awareness education in North America.

In the potential "gender heuristic trap", backcountry users may subconsciously attribute lesser or greater expertise to a given individual based on perceptions of their gender identity and rely on that for their personal risk management. Examples include assuming a female guide is more cautious than her male counterparts or that a male guide is more competitive than his female peers. Because an individual's gender identity does not directly correlate to their mountaineering or avalanche safety skills, decisions based on those perceptions have the potential to be inappropriate. Wheeler sums up her findings by imploring readers to "tune your antennae to what effects gender might be having on any group's dynamic, by making your own observations about how experience levels, age, circumstance, and personality are shaping each interaction". In dealing with human factors related to or exacerbated by gender, do not let your perceptions or stereotypes be a "gender heuristic trap" (Wheeler, 2008. p. 28).

While different attitudes certainly exist between male and female professional backcountry travelers, to assume that *all* women are more cautious and that *all* men rely primarily on their egos to make decisions would not give due credit to the skills and expertise of rangers and guides. The purpose of this study is to (a) provide a first examination of differences in the decision practices between male and female guides and (b) assess the potential for the existence of a gender heuristic trap among professional guides.

2. Methods

Professional mountain guides working on Denali during the 2014 season were an ideal population in which to do this initial research because climbing on the peak is managed by the National Park Service, so only six guiding companies—and a finite number of guides—are operating on the mountain during a given season.

2.1. Survey design

Following Stump, Hilpert, Husman, Chung, and Kim (2011), data were collected using a voluntary, anonymous online survey made available to all guides employed by Denali guiding companies in 2014. A link to the survey was distributed to guiding companies, which distributed the survey to their employees.

The survey consisted of three main sections. General demographic information was collected at the beginning of the survey. In addition, participants were asked to rate their respective risk tolerance in personal and professional settings by choosing one of the following descriptors: 'uncomfortable with any risk', 'comfortable with a small amount of risk', 'comfortable with some risk', or 'comfortable with a great deal of risk'.

To examine differences in decision practices between male and female guides, respondents were asked to rank a list of ten potential factors that might influence their decision-making while guiding (1: most important; 10: least important). The list of factors presented to participants were based on the results of an earlier pilot study. To avoid systematic response biases, the order of the factors was randomized for each survey participant. Respondents also had the option of replacing any of the provided factors with a fill-in-the-blank "other" option. Participants were also asked to rank the heuristic traps included in McCammon's FACETS mnemonic according to their perceived personal susceptibility to them (from most to least challenging).

To examine the potential of a gender heuristic trap, survey participants were asked to envision the individual with whom they felt safest while traveling in the backcountry. Participants had to specify whether that individual was male or female, and their experience level, age, risk tolerance, and level of avalanche training relative to the respondent (options 'higher', 'same', and 'lower').

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2.2. Analysis

Differences in demographics between male and female participants were examined with Fisher's exact test for nominal data or the Wilcoxon rank sum test for ordinal data. For all statistical comparison presented in this manuscript, p-values smaller than 0.05 were considered significant.

Male and female guides' rankings of the decision-making factors and perceived susceptibility to heuristic traps were averaged and compared. For each decision-making factor, separate male and female averages were calculated, along with a standard deviation for both male and female rankings of that factor. Finally, a two-tailed, two-sample t-test assuming unequal variance (H_0: $\mu_{male}=\mu_{female}$; H_a: $\mu_{male}>\mu_{female}$ or H_a: $\mu_{male}<\mu_{female}$) was run to determine whether significant differences in male and female rankings of a given factor existed. When significant differences between male and female guides' rankings existed, Pearson product moment correlation coefficients were calculated to examine relationships between a respondent's rankings of the factors and their demographic information. The same process was used to determine whether significant differences existed between male and female guides' perceived susceptibility to heuristic traps.

To examine the potential of a gender heuristic trap we examined differences in assessments of personal risk tolerance between male and female participants as well as differences in perceived risk tolerance of male and female preferred backcountry partners. These differences were examined using the Wilcoxon rank sum test.

3. Results and discussion

Of approximately 150 Denali guides in 2014, total of 48 usable responses were gathered, which is equivalent to a response rate of 32%. Participants ranged in age from 21 to 57 (median age 33). Eighty-three percent of participants (40 of 48) were male. The small percentage of female respondents (17%; 8 of 48) to this survey represents of limited number of female guides in the mountain guide population in Denali well.

Professional experience levels ranged from one season to 25, with a median experience level of 7 seasons. Participants' collective experience level totaled 395 seasons. Most guides held a Level 2 avalanche certification (56%; 27 of 48) or above (29%; 14 of 48). In addition to their avalanche training, guides had a wide variety of other certifications, including Wilderness First Responder training (83%; 40 of 48), an American Mountain Guide Association (AMGA) certification (43%; 21 of 48), American Avalanche Association (AAA) professional membership (12.5%; 6 of 48), and American Institute for Avalanche Research and Education (AIARE) instructor training (10%; 5 of 48). Male and female guides had similar levels of training and certification.

Among male guides, 92.5% (37 of 40) reported being comfortable with “some” or “a small amount of” risk. Among female guides, that number was 85.8% (6 of 7) (Table 1). One female participant did not provide an answer to this question. No female guides reported being comfortable with a great deal of risk in a professional setting (two male guides reported this). A Wilcoxon rank-sum test indicates that there is no statistical difference in the personal risk tolerance between male and female survey participants (p-value=0.496).

Overall, guides reported their own personal assessments of current avalanche hazards to be the factor that most influences their decision-making, followed closely by environmental factors (i.e. current and forecasted weather) (Table 2).

The broadest deduction to be drawn from guides' rankings of decision-making factors is that, by and large, male and female guides essentially focus on the same factors when guiding on

Table 1
Rating of personal risk tolerance.

Personal risk tolerance	Male	Female
Uncomfortable with any risk	1	1
Comfortable with a small amount of risk	19	3
Comfortable with some amount of risk	18	3
Comfortable with a great deal of risk	2	0
Total	40	7

Table 2
Rankings of decision-making factors.

Factor	Overall average (n=48)	Male average (n=40)	Female average (n=8)	p-Value
(1) My assessment of current avalanche hazard	2.74	2.65	3.29	0.484
(2) Environmental concerns	2.96	2.93	3.14	0.644
(3) Clients' skill level, experience, and risk tolerance	4.74	4.64	5.43	0.428
(4) My own ability	5.32	5.4	4.86	0.653
(5) Personal risk tolerance	5.62	6.1	2.86	0.021**
(6) Others' avalanche hazard assessment	6.17	6.15	6.29	0.907
(7) Employer protocols	6.32	6.26	6.71	0.642
(8) Time pressures	7.09	7.18	6.57	0.353
(9) Group dynamics	7.62	7.58	7.86	0.795
(10) Clients' satisfaction	8.45	8.28	9.43	0.004***
(11) Other	8.98	8.88	9.57	NA

Table 3
Trusted partners' perceived risk tolerance, relative to participant.

Perceived risk tolerance relative to participant	Partner	
	Female	Male
Higher	0	7
Same	3	29
Lower	3	6
Total	6	42

Denali. Only two factors produced significantly different male and female averages: clients' satisfaction (p=0.004) and a guide's own personal risk tolerance (p=0.21). Other than gender, no significant relationships existed between guides' rankings of those two factors and their age, level of training, or years of experience.

On average, female respondents ranked clients' satisfaction extremely low with an average score of 9.43. Though male guides also largely ranked clients' satisfaction near the bottom of the list, they gave an average rank of 8.28, more than a full ranking higher.

A guide's personal risk tolerance was also a decision-making factor on which male and female respondents differed significantly. Male guides, overall, ranked personal risk tolerance at 6.1, while their female colleagues gave it a much higher-priority 2.86. A Pearson product moment correlation coefficient test revealed only a weak relationship between these two factors (r=0.04), which highlights that the primary determining factor for ranking of personal risk tolerance is the guide's gender identity.

With respect to their perceived personal susceptibility to heuristic traps, guides on average ranked Familiarity at 1.6, by far the highest score. Expert Halo (2.7), Consistency (3.6), Tracks/Scarcity (3.98), and Acceptance (4.28) are listed here from highest to lowest. Social Facilitation received the lowest overall ranking, 4.85. No significant differences were identified between male and female responses for any of the heuristic traps. .

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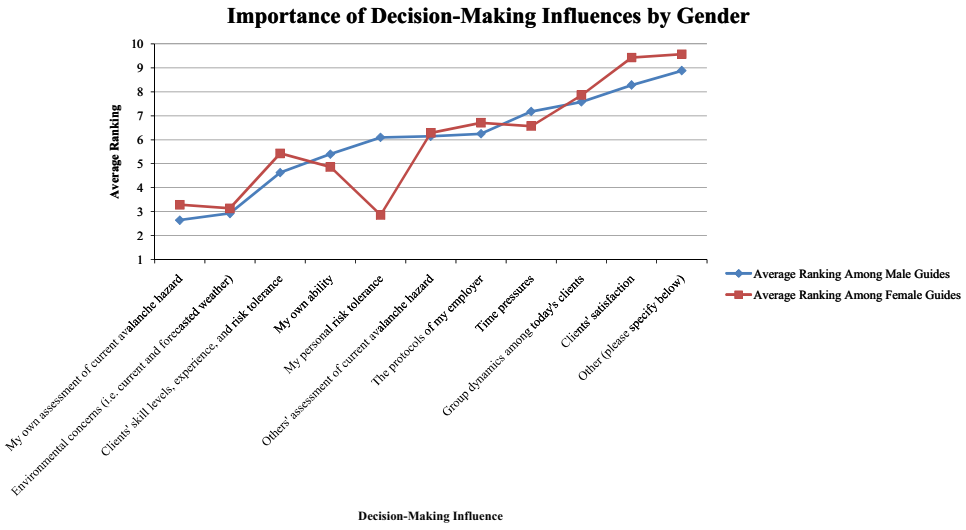

Fig. 1.

The trusted backcountry partner described by respondents was male in 88% of cases (42 of 48). Most guides reported that their partners had more experience than they did (77%; 37 of 48), were older than the respondent (56%; 27 of 48), had more training (52%; 25 of 48), and had a risk tolerance similar to that of the respondent (67%; 32 of 48). It bears noting that the trusted partners described by respondents were not necessarily other Denali guides—trusted partners were simply guides' preferred backcountry travel partners.

Only male respondents reported that their preferred travel companion was female (14%; 6 of 42) and all female respondents reported a male-identifying partner as their preferred companion (8 of 8). However, a Fisher's exact test shows that there is no significant difference in the gender distribution of trusted backcountry partners between male and female survey participants (p-value = 0.571). Of the preferred female partners cited by respondents, all were reported to have similar levels of experience and training to the respondent, but in 50% of cases (3 of 6), were perceived to have lower risk tolerance. The other half of female partners were reported to have similar risk tolerance; never higher (see Table 3). A Wilcoxon rank-sum test examining the differences in perceived relative risk tolerance between male and female partners confirms that the perceived risk tolerance of female backcountry partners is significantly lower than that of male partners (p-value = 0.040).

4. Conclusions

The most conclusive result of this study is the lack of statistical difference in the personal risk tolerance between male and female guides. Coupled with the result that the perceived risk tolerance of trusted female partners is significantly lower than that of male partners, this study suggests that Denali guides are potentially susceptible to the "gender heuristic trap." For example, if two guides—one male and one female—are leading a group of clients together and the male guide perceives his partner to have lower risk tolerance, he risks lowering his inhibitions, thinking his partner will speak up if the group encounters a risky situation. Because the female guide does not necessarily have lower risk tolerance, her partner's sense of safety is false, and he has fallen victim to the "gender heuristic trap." More research is needed to extrapolate this conclusion beyond the scope of Denali guides.

A more in-depth study with a larger sample size is required to study the topic of gender differences in mountain guiding in more detail. However, a major obstacle to obtaining responses for such a study is the remote nature of mountain guiding; the itinerant lifestyle of many guides may have been a limiting factor in the number of responses obtained. Additionally, a lack of female mountain guides meant a very small number of female responses. More insight could be gained into gendered decision-making processes by using a method other than the online survey, and by specifically targeting female guides at Denali or beyond. In-depth interviews or focus groups, either single- or mixed-gender, might provide more specific and conclusive information about decision-making processes and potential differences between male and female guides (Fig. 1).

Acknowledgments

This study was made possible by the generosity of Denali guides and their employers with their limited time during the pre- and post-season. Thanks is also due to the faculty of the Alaska Pacific University Outdoor and Environmental Education graduate program, especially thesis committee chair Eeva Latosuo. Committee members Steve Rubinstein and Wendy Wagner were indispensible during the course of this study. Finally, thanks to Aleph Johnston-Bloom for her insight, mentorship, and editing.

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