Heterogeneous preferences for trekking in bear habitat: The use of latent class stated preference choice model

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The purpose of this study is to examine visitor's heterogeneous preference on risky trekking in brown bear habitat (Ursus arctos yesoensis), applying stated choice approach. Numameguri trail, which is our study area, represents the high-density brown bear habitat in Daisetsuzan National Park, Hokkaido, Japan. Also, the trail is a nationally famous scenic trail especially for viewing fall leaves. Bear encounters on the trail may be pleasant experience for some visitors who want primitive recreational opportunities, but unpleasant for some visitors who want secure trekking. Therefore, park managers have to understand visitor's preferences for the trekking, then construct appropriate management plan.

A mail survey was conducted in September 2009. In total 1,536 questionnaires were handed out to visitors at the trailhead, and 970 (63.2%) were returned. There were 924 remaining completed responses. The questionnaire consisted of two components. The first component contained risk-attitudinal questions for visitor segmentation, such as the risk perception for bear encounter. The questions of risk perception were composed of 15 items taken partly from Slovic (1987) and Gore (2007). Responses to each item were measured on a five-point Likert scale. The second part of the survey contained a series of hypothetical choice tasks. Our choice experiment survey elicited visitors' preferences under hypothetical 25 trail scenarios with different attributes and levels: destinations, bear appearances, the number of visitors and patrol systems of the trail. Each respondent evaluated 9 randomly selected profiles out of 25 (hypothetical trail scenarios) with different attributes and levels, organized into three choice sets. In this study, profiles were designed using an orthogonal main effect design, which is frequently used in empirical studies (Louviere et al., 2000). Data obtained from the CE tasks were quantified using a random utility model, and a conditional logit model (McFadden, 1974) and a latent class model (McFadden, 1986; Swait, 1994; Boxall and Adamowicz, 2004) were applied. All attributes (or levels), except for the number of visitors, were coded (Louviere et al., 2000). Arbitrarily omitted level estimate is defined as the negative sum of the other level estimates.

The result of the conditional logit model showed that the positive parameter of bear appearances and the negative parameter of the number of visitors were both statically significant at 1% level, respectively. Significant parameter estimates with a positive sign mean that the attributes (or levels) influence respondents' utility positively, and those with a negative sign mean that the attributes (or levels) influence respondents' utility negatively. These findings suggest that the mean preference of the visitors was a secure trekking without bear appearances and solitude in the trail. More secure patrol systems were also preferred. The parameters of increasing the number of park rangers, introducing a guided-tour with trained guides and introducing park rangers carrying rifles with rubber bullets were statistically significant at 1% level with positive sign. However, the parameter of introducing park rangers carrying rifles with metal bullets was negative and significant at the 1% level. These results indicated that the mean preference of the visitors was the secure trekking in the trail, but they did not want to pursue it in exchange for extirpation of brown bear populations.

A serious problem of the conditional logit model is that the model assumes that the parameters are constant among all respondents. The result of the latent class model, which includes risk-attitudinal factors as membership variables, showed that visitors have heterogeneous preferences,

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and respondents are segmented into two different groups. One group consisting of 216 (23.4%) respondents contained inexperienced trekkers, and they are sensitive to the risks of bear encounter. They preferred much more secure trekking than mean visitors; furthermore, they tended to quit their trekking under risky situations. On the other hand, the other group consisted of 708 (76.6%) respondents who are experienced trekkers, and they regarded the risks of bear encounter as manageable. Although they did not prefer to have a bear encounter, they persisted in completing the full distance of the trail. Park managers have to consider these two types of visitors: inexperienced risk-aversive visitors and experienced risk-taking visitors.

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