The application of orthogonal experimental design to identify the interactive forces driving people’s perceptions of ecosystem services

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People's perception of ecosystem services is usually affected by a variety of interacting factors, making it difficult to identify the actual driving factors. An orthogonal experimental design can effectively identify interactions and has the potential for use in social perception studies. Based on 20,642 questionnaires on the topic of WTP (willingness to pay), the interactive forces driving people's perceptions of ecosystem services on the Tibetan Plateau were identified using an orthogonal experimental design. The results show that 1) when interactions are not considered, management attitudes have the strongest influence on WTP, the second most influential factors are subjective cognitions, and objective indicators are ranked last. 2) The interactions has a stronger impact on WTP than some of individual factor: when interactions and observed variables are compared simultaneously, the interaction between the “importance of the Tibetan Plateau” and the “WTP for residents” has a stronger influence on WTP (451 Chinese yuan/year) than any of the individual variables except “WTP for residents” (666 CNY/year) and “knowledge of the Tibetan Plateau” (484 CNY/year). Among the interactions between pairs of variables, that between education (212 CNY/year) and income (260 CNY/year) has a greater impact on WTP (266 CNY/year) than either variable alone. 3) When the interactions are considered, subjective cognitions are the most important indicators for WTP, and management attitudes are the second most important indicators. This study provides a feasible method for the identification of interactive driving forces in analyses involving questionnaires, and the conclusions can provide guidance from the public for ecosystem management on the Tibetan Plateau.

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