

Estimating "Evaluability" in the Evaluability Hypothesis of Preference Reversals

Kimihiko Yamagishi¹

Yoshiro Kunitake

Graduate School of Decision Sciences & Technology, Tokyo Institute of Technology

Since its discovery in 1971, preference reversal has remained one of central research agenda in behavioral decision making. Here, we focus on preference reversals between "Separate Evaluation (SE)," wherein each multiattribute choice alternative is evaluated in isolation, and "Joint Evaluation (JE)," wherein plural multiattribute alternatives are evaluated in a simultaneous comparison. Hsee (1996) proposed the "Evaluability Hypothesis" (hereafter EH) to account for preference reversals between JE and SE. In gist, EH is a theory of change in psychological weighting on different attributes of choice alternatives. In this paper, we introduce an "Evaluative Weighting Model" to elaborate the explanation by EH: The Evaluative Weighting Model allows us to estimate parameters of psychological weighting and examine the validity of EH.

As a JE-SE preference reversal example, take the "programmer salary assessment (Hsee, 1996, Study 2)." Hsee asked his participants to assess suitable salary for job candidates of programming in a hypothetical language. In a [GPA, Experience] format, one can express Candidate A as [4.9, 20 Programs] and Candidate B as [3.0, 70 Programs]. Notice that the attribute values trade off between the candidates. In SE, the participants rated A as deserving a higher payment, whereas in JE, the rated salary for B exceeded A.

EH explained the phenomenon as follows: The objects of assessment (candidates) consist of a familiar Easy attribute (GPA) and an unfamiliar Hard attribute (Experience). People reach WTP (willingness to pay: Salary in this case) assessments by evaluating each attribute and combining the evaluation into WTP . People readily assess the goodness of the Easy attribute, regardless of in SE or in JE, because of its familiarity. However, due to the lack of such familiarity, people face difficulty in evaluating the goodness of the Hard attribute in SE. It is in JE that people may grasp the goodness of the particular value of the Hard attribute because JE allows people to compare the relative strengths of the two candidates. Moreover, for the programming job, the Experience should be more directly relevant than GPA. EH accounts for the JE-SE preference reversals as a consequence of the enhanced evaluability of the more important Hard attribute in JE but not in SE, while the evaluability of the less important Easy attribute stayed intact across JE and SE.

In this work, we aim at measuring the evaluability changes between JE and SE by parameter estimation of psychological weighting onto the Easy and Hard attributes. To our knowledge, nobody has previously attempted such estimation of evaluability parameters. In doing so, we investigated how well the evaluability estimates follow the logic of EH.

AN EVALUATIVE WEIGHTING MODEL AND EMPIRICAL QUESTIONS

Formula (1) shows our Evaluative Weighting Model for the i^{th} choice alternative with two attributes, x_1 and x_2 :

$$WTP_i^{JE/SE} = \alpha_1^{JE/SE} \cdot x_{1i} + \alpha_2^{JE/SE} \cdot x_{2i} \quad (1)$$

The superscripts are either JE or SE depending on the way WTP is assessed. The α parameters denote the psychological weights associated to each attribute x . In the model, the α parameters represent the evaluability of the corresponding attributes. We remark here that we regard psychological weighting of a particular attribute as the evaluability of the attribute (such an assumption parallels Kahneman's characterization of evaluability in his keynote speech at the 2003 annual meeting of *Society for Judgment and Decision Making*).

One can use the model's terms to express Hsee's preference reversals of programmer salaries as follows:

$$WTP_A^{SE} > WTP_B^{SE} \ \& \ WTP_A^{JE} < WTP_B^{JE} \quad (2)$$

The following Formulae (3) express the pattern of evaluability, as hypothesized by EH, to produce the relationship in Formulae (2):

$$\alpha_{GPA}^{JE} \approx \alpha_{GPA}^{SE} \ \& \ \alpha_{Exp}^{JE} > \alpha_{Exp}^{SE} \quad (3)$$

The current empirical question asks if, upon replicating the WTP preference reversal in Formulae (2), α parameter estimates from the same WTP data would follow the EH prediction in Formulae (3).

EXPERIMENT

Because we recruited Japanese undergraduates for participants, we modified the aforementioned programmer salary assessment into the following "Manager Candidate Task." Our participants read the following instruction. "Assume yourself in charge of selecting a manager of your company's new branch office in Lebanon. Your task is to assess the suitable monthly salary for each candidate." We chose monthly salary because, in Japan, people customarily communicate their earnings in this unit. The Easy and

¹ kimihiko@ky.hum.titech.ac.jp

Hard attributes for each candidate were "偏差値 (Hensachi, or Dev)" of her/his Alma Mater and score of "Test of Arabic as a Second Language (TASL)," respectively. Dev stands for "Deviation Score," and is a linear transformation of z -score of each university's competitiveness rating with the mean of 50 and the standard deviation of 10. We chose Dev as an Easy attribute because it was the most well-known evaluation of Japanese universities. TASL is an imaginary test, and therefore, a Hard attribute. For Dev, we prepared the following three levels; 46, 55, and 64. TASL levels were 109, 326, and 634. By a factorial design, we prepared $3 \times 3 = 9$ hypothetical candidates.

Our participants ($n=153$) rated each candidate's deserving monthly salary. The SE group rated each candidate in isolation. The JE group examined a random list of the 9 candidates, and assessed a proper salary for each candidate.

RESULTS & DISCUSSION

①. Replication of Preference Reversals. We selected pairs of candidates wherein the Dev and TASL values traded off to compare the mean $WTPs$ in a JE-SE preference reversal manner. Fig. 1 shows an example. We use a [Dev, TASL] notation to express each candidate. The man salary (WTP) in Fig. 1 is expressed in a hundred-thousand yen unit.

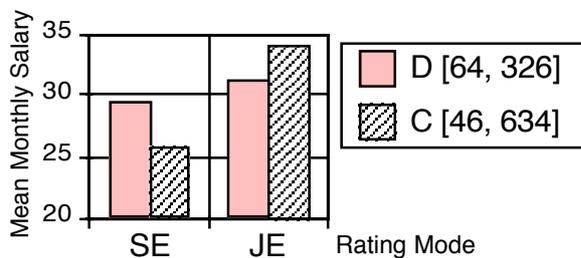


Fig.1. An Example of JE-SE Preference Reversal.

The mean ratings in SE showed $WTP_C^{SE} < WTP_D^{SE}$ ($t(28) = 2.842, p < .01$). JE showed $WTP_C^{JE} > WTP_D^{JE}$ ($t(115) = 4.830, p < .001$), hence, a JE-SE preference reversal.

②. Estimation of Weighting Parameters. For all candidates, we calculated 9 mean $WTPs$ for the SE salary rating to regress the mean $WTPs$ on the attribute values ($R^2 = .275, n.s.$). As standardized regression coefficients, we estimated α_{Dev}^{SE} and α_{TASL}^{SE} . Likewise, we estimated α_{Dev}^{JE} and α_{TASL}^{JE} as standardized coefficients of regressing mean JE $WTPs$ on the attribute values ($R^2 = .982, p < .001$). Fig. 2. shows the parameter estimates.

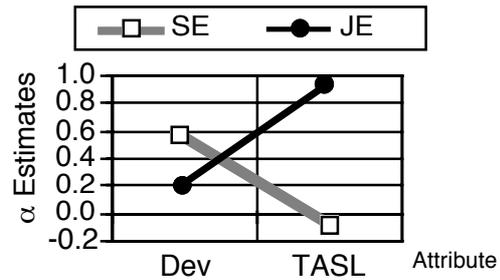


Fig. 2. Estimates of α Weights by Evaluative Weighting Model.

For TASL (Hard), EH predicts $\alpha_{TASL}^{SE} < \alpha_{TASL}^{JE}$. The pattern in Fig. 2, as well as the significance of α_{TASL}^{JE} ($t(6) = 23.279, p < .001$), confirm the prediction. Regression results for Dev (Easy) were partially consistent with EH. Although EH predicts comparable explanatory effectiveness of WTP for both α_{Dev}^{SE} and α_{Dev}^{JE} , α_{Dev}^{SE} failed to reach significance ($t(6) = 1.871, p = .110$) whereas α_{Dev}^{JE} did ($t(6) = 5.597, p < .001$). Yet, a meta-analysis of these t -test results did not indicate a reliable difference between α_{Dev}^{SE} and α_{Dev}^{JE} ($z = 1.133, n.s.$). We conclude that the evaluative weighting parameters were mostly consistent with the logic of EH.

CONCLUSION

Our Evaluative Weighting model uncovered psychological weighting of multiattribute choice alternatives in JE-SE preference reversals. Although the weighting parameters mostly followed the prescription of the EH, we noted minor deviations from EH, such as the insignificant evaluability of the Easy attribute in SE. Our future goal includes investigating the cases of no preference reversals (such as choosing between choice alternatives of both Easy or both Hard attributes) to see how well the EH prescription would match the estimated weighting parameters.

REFERENCE

Hsee, C. K. (1996). The Evaluability Hypothesis: An explanation for preference reversals between joint and separate evaluations of alternatives. *Organizational Behavior and Human Decision Processes*, **67**, 247-257.

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