Does Feedback Always Facilitate Learning?: Degree of Preference Development and Degree of Feedback Complexity

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The present work examines when a detrimental effect of cognitive feedback occurs. We suggest that (1) when cognitive feedback is complicated and (2) when learners developed their own preferences highly, cognitive feedback hinders learning and 'destabilizes' previously developed preferences.

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A long tradition of research based on the MCPL paradigm suggests that when feedback is provided, people learn functional relationships between cues and outcomes (Brehmer and Brehmer 1988; Hammond 1955). It has been found that feedback not only facilitates learning of the relationship between attributes and product quality (Meyer 1987) and between attributes and others' preferences (West 1996) but also stabilizes preferences by providing a framework to correctly identify the relationship between attributes and self-preferences (West, Brown and Hoch 1996).

As classic papers emphasized feedback as a learning facilitator, it has been extensively discussed what influences the impact of feedback on task outcomes (Hutchinson and Alba 1991). The moderators that have been found include learner variables such as goal or motivation, situation variables such as memory load or time pressure, cue characteristics such as salience or valence, and finally feedback type such as cognitive feedback. Further, at least two previous research projects revealed that outcome feedback, when an error on a particular task is large, can lead to negative task performance because people keep changing their original strategies and learning does not occur (Arkes et al. 1986; Hogarth et al. 1991).

As it is found that some feedback does not always facilitate learning, some researchers pay attention to a different type of feedback: cognitive feedback (Balzer, Doherty, and O’Connor 1989; Doherty and Balzer 1988; Todd and Hammond 1965). Compared with outcome feedback that provides information only about a true model, cognitive feedback provides information about relations: relations among cues, subject’s judgment, and criterion variable in environment. This approach is mapped on to Lens model suggested by Hammond et al. 1975).

The present research aims to demonstrate that even cognitive feedback does not always lead to an improved task outcome. More broadly speaking, our objective is to investigate when cognitive feedback hinders or does not hinder people from improving outcomes. In the present research, we consider learning as stabilizing self-preferences (West, Brown and Hoch 1996) and consider feedback as cognitive feedback: providing information about a functional relationship between attributes and pre-feedback preferences.

Here, we aim to demonstrate that the extent to which preferences are stabilized differs depending on one variable about learners and one variable about feedback quality: how much a pre-feedback preference is developed and how complicated a feedback is. The former variable, the degree of preference development, refers to how much pre-feedback preferences can be explained by available cues (attributes). For instance, some people are aware of several wine-related attributes that determine their preferences. In this case, their wine preferences are highly developed. Whereas, others evaluate wines without knowing much about what makes them prefer or choose, suggesting that their wine preferences are poorly developed. The proportion of pre-feedback preferences predicted by attributes will determine preference consistency. The latter variable, the degree of feedback complexity, refers to the amount of relationship-relevant information contained by feedback. For instance, suppose that a type of grape, a winery, and a production year can fully determine pre-feedback preferences. Simple feedback provides information about only one key factor and how it affects preferences (e.g., “you like wine produced later”), whereas complex feedback provides information about how all three attributes affect preferences (e.g., “you like the wine produced later, the wine created at a certain region of France, and the wine made by Shiraz”). In other words, the number of attributes about which feedback provides information determines feedback complexity.

We have two testable hypotheses: feedback stabilizes the preferences of (1) those who developed a low degree of pre-feedback preferences more greatly than the preferences of those who developed a high degree of pre-feedback preferences and (2) when the degree of complexity is lower than higher. The former hypothesis (1) is suggested by an idea that people who do not develop their own preferences (i.e., novices) have more room to learn their own preferences than those who already develop preferences (i.e., experts). The latter hypothesis (2) is consistent with the effect of information overload on decision making, suggesting that overwhelming information confuses people and prevent from learning (Lurie 2004). Interestingly, the second hypothesis that the fewer attributes will benefit preference stabilization suggests a discrepancy with a finding in West, Brown and Hoch (1996).

We conducted a 2 x 2 (degree of preference development: low vs. high) x (degree of feedback complexity: low vs. high) between-subjects design study by using 30 carefully designed chair pictures which consist of 5 binary attributes. Participants rated their preferences about 15 chairs, received one feedback, and then rated preferences about another 15 chairs. People whose R² about the first 15 preferences were lower than 0.6 are categorized as a lowly developed pre-feedback preference group and others belong to a highly developed pre-feedback preference group. Half the participants received simple feedback which provides directional relationship about only one strongest attribute, whereas the other half received complex feedback which tells directional relationships about all five attributes.
Results suggest hypothesis 1 but not hypothesis 2. The $R^2$ about the preferences increases when pre-feedback preferences are lowly developed, whereas it decreases when pre-feedback preferences are highly developed (0.21 vs. -0.4, $F=17.71, p<.01$), supporting the former hypothesis. As for the latter hypothesis, although the effect is not significant, data provide a directional support by demonstrating that simple feedback more strongly stabilizes preferences than complex feedback (0.12 vs. 0.05, $F=1.38, p>.2$). We hope to increase the number of observations to increase statistical significance. It is worth noting that neither those who lowly develop pre-feedback preferences (+0.09) nor those who highly develop pre-feedback preferences (-0.02) fail to increase their $R^2$ after feedback was provided.

Probably, the most interesting findings come from those who highly develop pre-feedback preferences and receive complex feedback. Their preferences become significantly destabilized after feedback is provided (-0.08, $t=-1.67, p=.10$), implying that feedback does not simply benefit but harms those who already developed their own preferences.