



The effect of mood on integration of information in a multi-attribute decision task

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ABSTRACT

The exact effect of different moods on choosing strategies in multi-attribute decision tasks is yet unknown since previous work has found apparently contradicting results. Furthermore, different theoretical accounts lead to opposite expectations. While the “mood-as-information” theory states that a positive mood leads to heuristic processing of information and application of non-compensatory strategies, the “broaden-and-build” theory expects more non-compensatory decision-making in a negative mood. To test the predictions of those two theories, we conducted two experimental studies, in which both the mood and the type of information search were manipulated. The results rather support “mood-as-information” theory, so participants in the positive mood made non-compensatory choices more often than participants in the negative mood. The effect was only present in the open information board, where the information was presented simultaneously, but not in the closed Mouselab, where the information had to be searched in a sequential manner.

1. Introduction

When it comes to taking an important decision, do you prefer to be in a good or a sad mood? While hedonism postulates that people prefer positive over negative emotional states, there may also be benefits of making a decision in a sad mood (for a review, see [Forgas, 2013](#)): being more attentive to the strength of arguments ([Sinclair, Mark, & Clore, 1994](#)) and more accurate in judgments ([Sinclair & Mark, 1995](#)). Being too positive, on the contrary, could lead to more stereotypical decisions ([Bodenhausen, Kramer, & Süsser, 1994](#)) and increase the reliance on the ease of retrieval heuristic ([Ruder & Bless, 2003](#)).

To investigate the systematic differences between how people make a decision in different moods, the current research focuses on the impact of negative mood on the use of decision-making strategies in a multi-attribute decision task. A multi-attribute decision involves the choice between at least two options based on the comparison of their attributes ([Payne, Bettman, & Johnson, 1993](#)). A decision-maker may apply compensatory or non-compensatory strategies to reach a decision ([Bröder & Newell, 2008](#)). To apply a compensatory strategy means to combine all available information about attributes' values of each option, such as a negative value of more important attributes can be compensated by positive values of other attributes. The attributes can be weighted equally (*Equal-weight rule*, *EQW*), or differently in accordance with their importance (*Weighted-additive rule*, *WADD*, [Payne et al., 1993](#)). The other strategy, that is non-compensatory, is to

consider the most important attribute that differentiates between options and to ignore less important attributes (so a negative value of the important attribute cannot be compensated by positive values of other attributes, “*Take-the-Best*” rule, *TTB*, [Gigerenzer & Goldstein, 1996](#)).

The differences between strategies can be outlined in a choice of which movie to watch based on recommendations of friends. If a person applies a compensatory strategy, she can consider all recommendations (either watch or not to watch) and sum them up (*EQW*) or apply different weights indicating the trust into opinions of different friends and choose the movie with the highest (weighted) sum score (*WADD*). In the case of using the non-compensatory strategy (*TTB*), the decision-maker chooses the movie preferred by the friend who has the highest trust rating among others.

Numerous studies were dedicated to finding determinants of the strategy selection process: memory ([Bröder & Schiffer, 2003](#)), attention ([Bröder, Glöckner, Betsch, Link, & Ettl, 2013](#)), time pressure ([Rieskamp & Hoffrage, 2008](#)), information costs ([Bröder, 2000b](#)), and emotional stress ([Wichary, Mata, & Rieskamp, 2016](#); [Wichary & Rieskamp, 2011](#)). At the same time, there is a lack of studies that bridge strategy selection and mood. Although there has been research on mood effects on judgments (see review in [Bless & Fiedler, 2006](#)), studies of the influence of positive or negative moods on the strategy selection are underrepresented.

Previous research found contradicting results that support different theories. The first theoretical approach based on the “mood-as-

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information theory” (Schwarz & Clore, 1996) considers negative mood as a trigger of more analytical and systematic processes, which leads to detail-oriented attention and consideration of all available information. The second approach of “broaden-and-build theory” (Fredrickson, 1998) emphasizes the ability of people in a positive mood to integrate all available information in a more efficient way. In the following, we outline mechanisms and predictions of both approaches. Additionally, the role of information search in the multi-attribute decision task is discussed.

2. Mood-as-information theory

According to the “mood-as-information” theory (Schwarz & Bless, 1991; Schwarz & Clore, 1996), a negative mood provides a stop signal that informs people that they may be in a problematic environment that demands a careful examination. On the other hand, a positive mood signals that the current environment is benign and therefore no careful information processing is required. This line of research is summarized in the literature as emotion effects on depth of thought (Lerner, Li, Valdesolo, & Kassam, 2015), where positive affective states are associated with the use of heuristic cues and negative states are related to systematic decision-making strategies. However, the difference between positive and negative states in depth of processing could additionally result not only from the valence of emotions but from the sense of confidence that those states convey: happiness has a high certainty appraisal, whereas sadness has a low certainty appraisal (Tiedens & Linton, 2001). The high certainty can lead to heuristic processing of information, but low certainty demands a more systematic way of processing. Empirical studies found that people in a positive mood prefer simple heuristics over detail oriented judgmental strategies (Bless et al., 1996; Schwarz & Clore, 1996) and base their judgments on a smaller amount of evidence in a choice task with self-truncated information sampling (Fiedler, Renn, & Kareev, 2010). In line with that, a state of depression leads to longer information search in a sequential decision task than a non-depressed state (von Helversen, Wilke, Johnson, Schmid, & Klapp, 2011).

The use of the compensatory strategy in the multi-attribute decision task requires processing of all cues about given options. Since people in a negative mood apply more systematic and detail-oriented strategies, the prediction of the “mood-as-information” theory is that they would use compensatory strategy more often than people in a positive mood.

3. Broaden-and-build theory

The “broaden-and-build theory”, formulated by Fredrickson (1998), emphasizes the adaptive value of emotions and states that negative emotions promote and support specific actions, or *specific action tendencies* that were described by Frijda (1986). By contrast, behavioral consequences of positive emotions (such as joy, interest, contentment, pride, or love) are vague, as far as they are not related to any problems in the environment. For instance, fear is linked with the desire to escape and anger motivates to attack, but joy is associated with aimless activation, interest with attending, and contentment with inactivity (Frijda, 1986). As a consequence of non-specific action tendencies, positive emotions broaden the scope of attention more than negative emotions (Fredrickson, 1998). Applied to multi-attribute decision making, broaden-and-build theory therefore predicts that people in a positive mood should incorporate more information into their decisions than people in a negative mood.

Fredrickson and Branigan (2005) found that a positive mood expands attention in the adapted version of the global-local visual processing task (Kimchi & Palmer, 1982), such as people in the positive mood group more often based their comparison judgments on a configuration of elements (instead of a shape of each element) relative to people in a neutral state. The broaden-and-build theory is also supported by findings that people in a positive mood produce patterns of

thoughts that are unusual, flexible, and creative (Isen, Daubman, & Nowicki, 1987).

The same line of reasoning may lead one to expect more compensatory decision-making in a positive mood since the use of the compensatory strategy requires the integration of all available information. In line with that, Scheibehenne and von Helversen (2015) found support for this hypothesis using a multi-attribute decision task, in which participants had to select which movies were more successful at the box office. In an online experiment, the authors provided the participants with all information about the options on an open decision board without the need for search. The authors interpreted the finding that positive mood increased the use of compensatory decision strategies as evidence for a broader focus of attention. The current study employs the same multi-attribute decision task and replicates as well as extends Scheibehenne and von Helversen’s (2015) procedure by comparing it to a task involving active information search.

4. Role of information search

We conjecture that the influence of mood on strategy selection in decision making also depends on how information search is structured. Glöckner and Betsch (2008b) suggested that immediate access to information triggers more automatic decision-making characterized by the ability to integrate a large amount of information in short time. Constraints on information search, on the contrary, lead to more systematic information acquisition behavior (Lohse & Johnson, 1996). Demand for information search might activate rather analytic processes of decision-making, which operate through the use of logic and evidence (Slovic, Finucane, Peters, & MacGregor, 2007) and reduces the reliance on emotions.

Differences in information search can be experimentally studied in two different paradigms: open information boards, where all information about options is presented at once, and a closed “Mouselab”, where only one piece of information on the board can be inspected at a time (Payne, Bettman, & Johnson, 1988). The open information board paradigm focuses on studying the integration of information, whereas the closed Mouselab paradigm is primarily used to study information search processes. It was found that in open information boards people can quickly integrate information without deliberative calculation of weighted sums (e.g., Glöckner & Betsch, 2008a; Söllner, Bröder, & Hilbig, 2013). On the other hand, the closed Mouselab produces a serial mode of information search and fosters the application of deliberate, rule-based decision strategies (Glöckner & Betsch, 2008a). Additionally, higher costs in the closed Mouselab paradigm increase the probability to use a non-compensatory strategy (Bröder, 2003; Bröder & Schiffer, 2003). Therefore, decision-making strategies in both paradigms might be affected by the type of information presentation, which would consequently moderate the influence of mood.

The mood-as-information and broaden-and-build theories do not make specific predictions regarding the effect of positive and negative moods dependent on the way how information is presented in the task, and multi-attribute decision research has often relied on search data to infer decision strategies (see critique by Bröder, 2000a). Hence, building on Glöckner & Betsch’s (2008a) important distinction between tasks that require a sequential search or not, an additional question of the current research is to analyze the interaction between the influence of mood and the type of task (open information board vs. closed Mouselab).

To investigate the potential role of mood and information search in strategy selection, we conducted two experiments, where the type of information processing and the mood were manipulated in a between-subject design. Experiment 1 was conducted as a web-study, and Experiment 2 was run in the laboratory.

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