

PEOPLE IN NEGATIVE MOOD MAY SEE RELATIONS WHERE PEOPLE IN POSITIVE MOOD MAY NOT

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ABSTRACT

The paper presents an experiment that bridges emotional and analogy-making research. It suggests that relational correspondences may depend on long-lasting emotional states (i.e. mood). In congruence with the research demonstrating different information processing depending on positive and negative mood, the presented experiment shows that participants in positive mood made more attribute correspondences, while participants in negative mood – more relational ones.

INTRODUCTION

A growing body of research focuses on the influence of emotions on cognitive processing. To date, the influence of affective information was primary investigated by manipulation of mood.

In general the finding support the idea that negative affective states foster bottom-up data driven processing, while positive affective states encourage effortless top-down processing (for a detailed review, Schwarz, 2002). For example, sad and happy participants heard a restaurant story that contained both script consistent and script inconsistent information (Bless, Clore, Schwarz, Golisano, Rabe and Wolk, 1996). Participants in happy mood recognized previously heard script inconsistent information but showed high rates of misrecognition of previously not presented script consistent information. Neither of these effects appeared in the recognition of previously heard restaurant story under negative mood. These results were interpreted as supporting the hypothesis that happy participants rely

more on schemas (i.e. scripts), while sad participants rely more on detailed oriented bottom-up and effortful processing of the incoming information. These two opposite processing styles were found to affect differently the performance on several types of cognitive tasks.

Isen and Daubman (1984) showed that participants in happy mood made more inclusive categorizations relative to a control. For example, happy participants were more likely to include “camel” and “feet” to the category “vehicle” than controls. Happy participants were also found to sort colored chips in smaller number of piles and to list more unusual exemplars of given category than sad participants (Hirt, Levine, McDonald, Melton, and Martin, 1997). Isen (1987) suggested that people in happy mood may outperform people in sad mood because of this specific categorization processes. Happy mood facilitates recall of diverse material and hence makes possible drawing of novel connections and insights. It was demonstrated, indeed, that participants in happy mood outperformed sad or neutral-mood participants on Remote Associates Test (Isen, Daubman and Nowichki, 1987) and listed more unusual first associates of neutral words than sad or neutral-mood participants (Isen, Johnoson, Metz and Robinson, 1985). Moreover, happy mood was also reported to facilitate performance on Duncker’s candle task relative to a neutral or sad mood (Isen and Daubman, 1984).

Several researches consistently showed that people in positive mood were equally persuaded by strong as well as weak arguments compared with non-manipulated or sad participants (Bless, Bohner, Schwarz and Strack, 1990; Bless, Mackie and Schwarz, 1992;

Bohner, Crow, Erb and Schwarz, 1992; Mackie and Worth, 1989, Worth and Mackie, 1987). Since elaborative and systematic processing of message content was considered to give advantage of strong versus weak arguments in persuasion, mood states were assumed to influence the processing strategies. People in happy mood spontaneously rely on simplifying strategies (i.e. communicator's status or expertise; see, Worth and Mackie, 1987) and general knowledge in processing of incoming persuasion message. On the contrary, people in sad mood are more likely to engage in systematic and elaborative scrutinizing of a counterattitudinal message¹. Similarly, participants in happy mood are more likely to form impressions based on category membership than participants in sad mood. Sad participants rely more on the individuating information rather than on stereotypes during impression formation (Bless, Schwarz and Kamelmeier, 1996, for a review).

These seemingly contradictory findings from creativity and social cognition domain were explained by the means of mood congruent recall (Isen, 1987; Mackie and Worth, 1989). Positive mood facilitates recall of larger amount of information than negative mood, because positive memories were assumed to be tightly interconnected than negative material stored in our memory. In this way, novel connections between disparate ideas became more probable under positive mood (Isen, 1987). This extensive recall, however, may hinder the use of effortful detail-oriented processing under happy mood and in turn may underpin the use of effortless simplifying heuristics (Mackie and Worth, 1989).

¹ The effect of mood on processing of a persuasive message was eliminated when participants were aware of the real cause for their momentary mood (Sinclair, Mark, and Clore, 1994).

INFLUENCE OF EMOTIONS ON ANALOGY-MAKING

Though, the influence of analogy on emotions was thoroughly described by Paul Thagard (2001), the opposite issue concerning the way emotions influence analogy-making was scarcely investigated.

Tohill and Holyoak (2000) demonstrated that situationally induced anxiety reduced relational based mapping and increased attribute based mapping in the case of cross-mapping task. These findings were explained in congruence with the Eysenk's working memory restriction theory (Eysenk and Calvo, 1992) suggesting that anxiety restrict working memory capacity. Reduced working memory capacity, in turn impeded higher-order relational mapping needed for solving of cross-mapping tasks used in this particular study.

Later, Vankov, Kiryazov and Grinberg (2008) explored the influence of fear on analogy making in the AMBR model (Kokinov and Petrov, 2001). The authors took the perspective of Revelle and Loftus (1992) who suggested that the effect of arousal on memory can be explained in terms of "tick rate hypothesis", i.e. arousal may increase the rate at which the environment is sampled. This "tick rate hypothesis" was modeled by making the rating mechanism dependent on the level of the activation of the concept fear. The rating mechanism in AMBR locally determines the winner correspondence at the constraint satisfaction network. Increasing rating frequency may cause the model to disregard the structural correspondences at expense of superficial ones. Thus in the case of cross-mapping task the model predicts a sudden jump from making structurally consistent mapping to the superficial one depending on the level of the activation of the fear concept.

These findings, however, concern the influence of specific emotion (i.e. anxiety or fear) on analogical mapping. In contrast, the present research is interested in the way mood rather than specific emotion may change analogy-making processes.

EXPERIMENT : HOW EMOTIONAL STATES INFLUENCE PERFORMANCE ON MATCHING-TO-SAMPLE TASK

Imagination technique for induction of positive and negative emotions was used. Participants were asked to recall a particular past episode from their life that was connected with a strong positive or strong negative emotion and to describe it briefly on a sheet of paper. Then during an unrelated matching to sample task, participants were asked to judge whether a sample stimulus is similar to relationally similar but superficially dissimilar stimulus or to a relationally dissimilar but superficially similar stimulus.

METHOD

Design

One factorial design was used for this experiment. The independent variable was the type of emotional state: positive or negative emotional state. The dependent variable was the number of the similarity judgments based on the relational similarity between the sample and target stimulus.

Materials

Six target stimuli were designed based on the stimuli of Medin, D., Goldstone, R. and Gentner, D (1990) and Sloutsky and Yarlas (submitted). Each stimulus contained 3 groups of geometric forms: B (i.e., the standard that was always presented at the center of the screen), T1 and T2, presented respectively at the lower left and lower right part of the screen. Both T1 and T2 were similar to B, but for different reasons. One of them shared similar attributes (i.e. included identical in form and shading figure/figures but the relations between figures in this superficially similar option were not kept analogical to the relations between figures in the standard) and the other – similar relations (i.e. at least one of the fig-

ures in this option was different in form/in form and shading but the three figures kept the same relations as the standard group). All target stimuli used in this experiment are presented in Appendix A. The position of the superficially and of the structurally similar to the standard “B” options was varied across participants and items.

Procedure

Participants were asked to participate in 2 unrelated short experiments. The first one was said to aim collecting of typical situations that evoke positive and negative emotions in real life situations. On that account participants were instructed to try to remember a particular situation from their own life that gave rise to a strong positive or negative emotion, to imagine the recalled situation and to describe it with a few sentences. After fulfilling this task, which usually took from 5 to 10 minutes, participants were enrolled in the matching-to-sample experiment for the next 5 minutes. Their task in this second experiment was to judge whether “T1” or “T2” are similar to the standard “B” by pushing the respective button on a BBOX: the left button “T1” and the right button for “T2”. When participants gave their answer the next stimulus appeared on the screen. The presentation order of the six target stimuli was randomized across participants. The timing of event for the matching-to-sample task is presented on Figure 1.

Then participants were fully debriefed and set free.

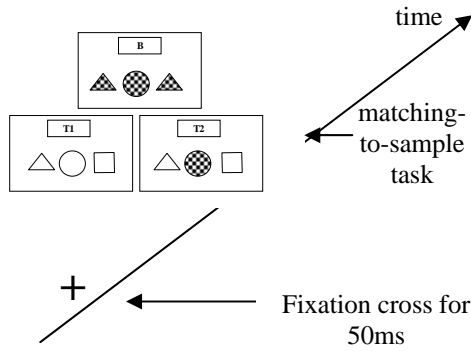


Figure 1. Timing of events for one trial in experiment 1.

Stimulus N	positive mood	negative mood
1	.29	.33
2	.24	.29
3	.10	.24
4	.14	.33
5	.33	.48
6	.38	.48

Table 1. Mean number of relational similarities for each stimulus per experimental condition

Participants

42 students from New Bulgarian University (21 women and 21 men) took part as volunteers in the experiment. Half of them participated in the positive emotion group, the other half in the negative emotion group. The mean age of the participants was 22.92 ranging from 18 to 34 years.

RESULTS AND DISCUSSION

The mean number of relational similarities chosen for each target stimulus was calculated (Table 1). The difference between mean relationally based similarity judgments obtained in the group under positive (0.246) and under negative mood (0.357), appeared to be significant tested with the Repeated Measures ANOVA: $F(1,5) = 22.273, p < 0.05, ES = 0.817$.

Participants in both mood conditions made more matching judgments based on attributes, i.e. relationally based judgments were less than 0.5 for both experimental conditions. Participants in negative mood, however, made more similarity judgments based on relations than participants in positive mood (Figure 2). Hence, negative mood facilitates relational based mapping, while positive mood – attribute based one.

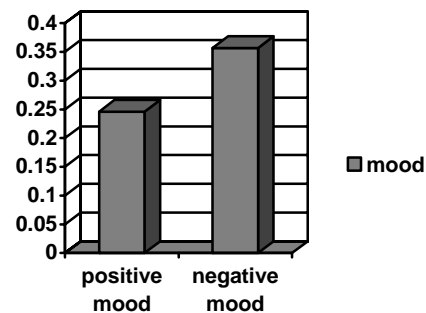


Figure 2. Mean number of relationally based similarity judgments for positive and negative condition

Moreover, the effect of mood was obtained in the absence of significant difference for response times: $F(1,5) = 0.021, p > 0.05$. The mean response time for the similarity judgment under negative mood was 4636.2ms and under positive mood was 4591.9ms. Thus both groups used comparable amount of time for solving matching-to-sample tasks. It seems, however, that participants in positive mood invested their time in making attribute correspondences, while participants in negative mood – in making relational correspondences.

CONCLUSION

The experiment presented in the paper focuses on the influence of mood on matching-to-sample task. It appeared that participants in positive mood based their similarity judgments on attributes, while participants in negative mood – on relations. It is not clear, however, whether mood influenced encoding of relations or rather the degree to which people rely upon relations. Nevertheless, this research opens an interesting question concerning the possible influence of the internal emotional long-lasting states on analogical mapping.

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APPENDIX:

Stimuli used in Experiment 1. The relationally similar to the standard "B" options are, respectively: T1, T2, T1, T2, T2, and T1.

