The experiential and rational systems of information processing in subclinical depression.

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ABSTRACT

The purpose of this study was to examine the systems of dual-mode information processing (Epstein, 1994) used by subclinically depressive people. A modified version of ratio-bias paradigm presented by Pacini et al. (1998) was employed to investigate whether depressive and nondepressive subjects (45 female undergraduates) used an experiential (intuitive) or rational system. The subjects' behavior was assessed under the condition where an observer was either present or absent. The results of the experiment showed that depressed subjects tended to more often use the rational system than nondepressed ones, irrespective of the presence of observer.

INTRODUCTION

Clinical and social psychological studies on depression have demonstrated that depressive people have negativity bias in social perception and judgment (e.g., Abramson, Seligman, Teasdale, 1978). However, it was found that subclinically depressed college students more often made accurate judgments than nondepressed

controls in the contingency paradigm, which is known as the *depressive realism phenomenon* (Alloy & Abramson, 1979). Researchers have examined this inconsistency and found that the depressive realism was only seen in the situations that were unimportant for subjects such as the laboratory setting. In consequential situations, where the outcome of task was significant or the subjects' involvement was strong, it was confirmed that depressed people showed negativity bias.

Pacini, Muir, & Epstein (1998) explained why the depressive realism has been found only in the trivial situations from the viewpoints of dual-mode (experiential-rational) information processing system. The experiential system operates in an automatic manner, and heuristic rules are used in the system. The system is also related to affect. On the other hand, the rational system is effortful, analytical, conscious, and relatively affect-free (Epstein, 1994). It is plausible that people prefer the experiential processing to save cognitive resources in trivial situations, while they prefer the rational processing in consequential situations. However, from findings on the depressive realism, Pacini et al. hypothesized that depressed individuals would use the rational system in trivial situations, and the experiential system in consequential situations.

To confirm this hypothesis, Pacini et al. have conducted an experiment where the ratio-bias (RB) paradigm was used. In the paradigm, subjects encounter a conflict between neumerosity heuristic (experiential system) and ratio (rational system) in a game. Suppose you draw lots and you earn some money if you draw a hit. Two trays of red and white jelly beans are shown to you, and you are told to choose one from the two trays to draw the beans. Little one has 10 jelly beans, 1 of which is a hit (red jelly bean), and big one has 100 jelly beans, 9 of which are hits. The little tray offers more favorable odds than the big one, but the big tray has more hits than the little one. If you chose the

little one, this indicated you thought much of the ratio, which means you used the rational system. On the other hand, if you chose the big one, then it meant that you used experiential system, in which the number was thought much of. In Pacini et al.'s study, it have shown that the depressed group more often chose the little tray than the nondepressed group in a low significance condition (getting $2) and there was no difference between the two groups in a high significance condition (getting $10). This result is thought to show that the depressives used the rational system when situations are trivial. It was not demonstrated, however, that, depressed people used the experiential system in consequential situations, as Pacini et al. hypothesized. In addition, choosing tray is the alternative response, which means choosing the little (or big) tray indicates the rational (or experiential) system uses and the other system doesn't use. In this paradigm, it is not possible to compare the strength of rational system with that of experiential system. So it is not evident from Pacini et al. that the depressed group used the rational processing because either the rational processing is excessively strong, or the experiential processing is excessively weak, or both.

The purpose of this study is to re-examine how depressed people use the two processing systems, employing the situations in which the presence of an observer was manipulated and a modified version of RB paradigm. The possibility of the disapproval or failure is significant for depressed people (e.g., Benassi & Mahler, 1985). Thus, when the behavior of depressed people is observed by the other, this is thought to enhance the situational importance for them. That's why the situations with or without the observer is used as the manipulation of importance to examine the processing of the depressives. In this study, the original RB paradigm was also modified to be able to assess the ratio and the number respectively. Four tray were set depending on the ratio and the number

of the hit; A) high and large ,B) high and small C) low and large, and D) low and small. The 6 pairs of the four trays were presented to the participants in turn. For example, if the pair of C and D trays is shown and C tray is chosen, then it means they choose the tray depending on the number. As the same, from the pair of A and C, that they choose A tray means the ratio is depended on. After the six trials, the frequencies of choosing trays based on the ratio and the number were calculated and analyzed. With these changes, the Pacini et al.s' hypothesis that depressed people would use experiential processing in trivial situations, and use rational processing in consequential situations was examined.

METHOD

Sample

The sample was selected from 344 female undergraduates who responded to Beck Depression Inventory (BDI; Beck, Ward, Mendelson, Mock, & Erbaugh, 1961). Initial selection was based on the score of the BDI. The participants who scored in the top 25% of BDI were designated as the depressed group The participants who scored in the bottom 25% of BDI were designated as the nondepressed group. Then the students participated in the experiment, where they completed the questionnaire of BDI again (BDI2). The students designated to the depressed or nondepressed group had to obtain the BDI2 score in the same range of top or bottom 25% of BDI not to remove from the group. The participants did not meet this criteria were removed. After the result of this selection, the data of 45 subjects analyzed. The number of subjects designated to the depressed and nondepressed groups and the low and high significance conditions is presented in Table 1.

Material

BDI (Beck et al., 1961) BDI consists of 20 items which assess the severity of depression. Each item has 4 sentences describing how severe depression is on the affect, physical condition, motivation, so force. These 4 sentences were assigned 0 to 3 points according to the severity. The higher BDI score is, the more depressed the respondent is.

RB paradigm

Four plastic trays, that is, two big and two little ones, had their own combination of red and white glass tips. the red glass tips were the hits. As shown in Table 2, two levels of the ratio and the number were set and reflected in the four trays. The big trays contained 14 red glass tips (large number), and the small trays contained 2 red glass tips (small number). The ratio of red to all glass tips in the one big and one little tray was 2:20 (high ratio), the ratio in the rest two trays was 2:25 (low ratio). Each tray was labeled with the number of red and white glass tips.

Procedure

After completing the questionnaire of BDI, the participants were instructed that the aim of RB paradigm was to draw a red glass tip without seeing the inside of trays. Two rounds were found in the paradigm. In the first, the experimenter presented two trays to the participants and told that they choose one of the two trays in which you wanted to draw a glass tip. In the second, the experimenter placed the chosen tray behind a cardboard screen, scrambled the glass tips, and had the participants draw a tip from the tray. Six trials were performed to present all the pairs of four trays. In low significance group, the participants performed the trials without the other. The participants designated to high significance group were observed by the other while performing the trials. The observers in the high significance condition were instructed to carefully see

which tray the participants choose and if they draw the red glass tip. After these trials were finished, the participants responded to the questionnaire of manipulation check and were debriefed.

RESULTS and DISCUSSION

Manipulation check

Responses to four items for the manipulation-check of situations were compared between the depressed and nondepressed groups. The result of the item for measuring the degree to which trays were seriously chosen showed significant differences between two groups (t (43) = 2.32, $p < .05$), although the participants of low significance condition (M = 4.08, SD = .72) were more seriously than those of the high significance condition (M = 3.48, SD = 1.03). This result was opposite to the expectation. The other three items showed no differences between the two conditions.

Analysis of perceived importance of the number and ratio

To examine the perceived importance of the number and the ratio in the tray choices, the scores of ratio and number were computed. The score for the number was calculated by subtracting the frequencies of the choice of containing less red glass tips (C and D in Table 2) from the frequencies of the choice of containing more red glass tips (A and B). On the other hand, the score for the ratio was calculated by subtracting the frequencies of choice of the trays having less favorable odds (B and D) from the frequencies of choice of the tray having favorable odds (A and C). An analysis of variance (ANOVA) was conducted for the score of number, with depression status, significance of situation serving as independent variables. As the result, a significant main effect of depression status was shown (F (3, 41) = 4.90, $p < .05$), indicating that the depressed group (M =

-.90, *SD* = 2.11) more often chose the little trays containing the smaller number of red glass tips than the nondepressed group (*M* = .52, *SD* = 2.27). There were no effects of significance of situation or interaction of depression status and significance of situations. The score of ratio was also analyzed through the same model. There were no effects of depression status, significances of situations, and their interaction.

The results of manipulation check indicated that the manipulation was not effective to enhance the significance of situation and that the two significance conditions were similar in the extent to which situations were regarded as significant. Thus, the significance of situation would have been regarded as trivial by both the participants who were designated to the low significance condition and those designated to the high significance condition. The analysis of variance for the score of number, however, showed that the depressed group more often chose the smaller trays than the nondepressed group. These results suggested that depressed people would use rational processing in trivial situations because of their excessively weak experiential processing. This study could not examine the processing system of depressive individuals in the consequent situations due to the failure of manipulation. Nevertheless, it is suggested that the weakness of the experiential system is involved in the process the depressive realism occurs. Further studies are needed to examine the processing style of depressed people in the consequent situations and to clarify the way of information processing in depression.

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Table 1 Participants allocated design

	Significance of the situation	
Group	Low	High
Depressed	12	10
Nondepressed	12	11

Table 2 Manipulation of ratio and number

	Ratio	
Number	High（10/100）	Low（8/100）
Large (big tray)	A 14/140*	B 14/175*
Small (little tray)	C 2/20*	D 2/25*

*the number of red glass tips／the total