The Relationship Between Rumination and Task Switching

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Abstract

Rumination is the tendency for perseverative thinking, characteristic of some clinical disorders such as depression. Previous research has investigated the potential relationship between rumination and the perseveration that occurs in multitasking situations. One study found a negative correlation between rumination scores and response congruency effects in task switching, suggesting that the cognitive mechanisms associated with perseveration in task switching might be different from those associated with the perseverative thinking exhibited by people with depressive tendencies.

Introduction

Rumination is a mode of recurrent and perseverative thinking, characteristic of some clinical disorders, such as depression. Previous research has investigated the potential relationship between rumination and the perseveration that occurs in multitasking situations. One study found a negative correlation between rumination scores and response congruency effects in task switching, suggesting that the cognitive mechanisms associated with perseveration in task switching might be different from those associated with the perseverative thinking exhibited by people with depressive tendencies.

Method

120 subjects from Purdue University completed two activities (RRS and task switching) in a single session lasting 30 min.

Ruminative Responses Scale (RRS)

The RRS was a survey of 10 items from Trierter et al. (2003), asking subjects to rate how often (1 = almost never; 4 = almost always) they think or do various things when they feel sad or depressed (e.g., “Go away by yourself and think about why you feel this way”). The mean rating was a subject’s RRS score.

Task Switching

The task-switching phase closely replicated Experiment 1 from Schneider (2015). Subjects performed two tasks on words: judging whether the word refers to something living or nonliving (e.g., ant is living; sofa is nonliving) or small or large, relative to the size of a basketball (e.g., pin is small; elefant is large), by pressing keys on a response box. Words were associated with the same response or different responses across tasks (congruent and incongruent, respectively). A cue (living/nonliving or small-large) indicated the relevant task to perform on each word. Cues were randomly selected, resulting in task switches and task repetitions across trials.

Results

Mean response times (RTs) and mean error rates (ERs) in the task-switching phase were analyzed with 2 (transition: task switch or task repetition) x 2 (response congruency: incongruent or congruent) ANOVAAs. The data are shown in the bar graphs. Results:

• Significant main effects of transition (both ps < .001), indicating switch costs on RTs (task switches were 101 ms slower than task repetitions) and ERs (task switches had 1.8% more errors than task repetitions).

• Significant main effects of response congruency (p = .002 for RTs, p = .001 for ERs), indicating response congruency effects on RTs (congruent trials had 3.1% more errors than congruent trials).

• Interaction was nonsignificant for RTs (p = .544), but significant for ERs (p = .001); the latter reflected a larger response congruency effect for task switches (4.8%) than for task repetitions (1.5%).

Correlations between rumination scores, switch costs, and response congruency effects were calculated:

• Rumination scores were not significantly correlated with switch costs on RTs (r = .059, p = .520) or ERs (r = .062, p = .503), or with response congruency effects on RTs (r = .29, p = .756) or ERs (r = .137, p = .137). The data are shown in the scatter plots.

• Some aspects of task-switching performance were significantly correlated with each other: switch costs on ERs and response congruency effects on ERs (r = .308, p = .001); switch costs on ERs and response congruency effects on RTs (r = .210, p = .021); response congruency effects on ERs and RTs (r = .286, p = .002).

• These positive correlations indicate that worse performance on one measure was sometimes associated with worse performance on another measure, as might be expected.

Discussion

The task-switching findings replicated those of Schneider (2015). There were switch costs (worse performance for task switches than for task repetitions) and response congruency effects (worse performance for incongruent than for congruent words), suggesting perseverative thinking about the irrelevant task when performing the relevant (cued) task. However, there were no significant correlations between rumination scores and either switch costs or response congruency effects. This suggests that the cognitive mechanisms associated with perseveration in task switching might be unrelated to those associated with the perseverative thinking exhibited by people with ruminate tendencies. A caveat is that the two modes of perseveration occur at different time scales (seconds for task switching, minutes or hours for rumination). A direction for future research could be to see whether a reliable relationship emerges when task switching is investigated at a longer time scale.

References: