

Commentary

A Replication by Another Name

A Response to Devilly et al. (2007)

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On the basis of a cognitive-environments conceptualization of dissociation (Freyd, Martorello, Alvarado, Hayes, & Christman, 1998; DePrince & Freyd, 1999), DePrince and Freyd (2001, 2004) predicted and found that under divided-attention demands, high dissociators, relative to low dissociators, recalled fewer trauma-related words (e.g., *incest*) and more neutral words that were to be remembered. Devilly et al. (2007, this issue) present two attempts to replicate this statistical interaction between dissociation and word content under the specified conditions, using the item version of the directed-forgetting task. We are puzzled by their conclusion that these results were a “lack of replication” (p. 212) because both tests of the interaction hypothesis confirmed previous findings with comparable effect sizes, though at higher p values because of a lack of statistical power. The pertinent hypothesis has now garnered substantial support across four studies, with an average effect size d of 0.67 (95% confidence interval, CI: 0.32, 1.01). Here we discuss important features of the statistical analyses and hypotheses tested in the report by Devilly et al.

EFFECT SIZES AND SIGNIFICANCE

Devilly et al. performed two studies that were characterized as replicating the procedures from DePrince and Freyd’s 2001 and 2004 studies. As a matter of fact, Devilly et al. twice replicated the item procedure from the 2001 study (and did not use the list procedure from the 2004 study), merely varying the number of times words were presented. Thus, these new findings should be directly compared with the 2001 results, which yielded an effect size d of 0.59. In Studies 1 and 2, respectively, Devilly et al. found effect sizes of 0.58 and 0.47 (G. Devilly, personal communication, June 13, 2006), which are remarkably similar in magnitude to the original result.

We suspect that Devilly et al. considered these findings nonreplications because they were not statistically significant. However, the Study 1 finding is actually significant at the traditional .05 level when measured, as would be appropriate, by

a one-tailed test, $t(36) = 1.76$. More important, the power calculations Devilly et al. used demonstrate that both of the studies were severely lacking in statistical power. Given the previous effect size of 0.59 for the item procedure, 70 participants would have been needed per study (35 low dissociators and 35 high dissociators) to reach power of 0.80. However, Devilly et al. collected data on only 23 low dissociators and 14 high dissociators in Study 1 and 20 low dissociators and 17 high dissociators in Study 2. When these two studies are combined to regain power, the interaction effect is replicated, $d = 0.52$, $z = 2.0$, $p < .05$.

INTERACTION HYPOTHESIS

Devilly et al. may also have considered their findings nonreplications because of possible uncertainty over our hypothesis. As originally formulated, the hypothesized effect is a statistical interaction between dissociation level and word content (trauma vs. neutral) in recall under divided-attention conditions. Devilly et al. direct the reader to their Figure 1 to support their claim that “our studies did not show this interaction” (p. 214). However, this figure displays the full cell means, which are a linear combination of the grand mean, both main effects, and the interaction term. In such a display, “seeing” the interaction by itself can be difficult (Rosnow & Rosenthal, 1989). Residuals that reflect the pure interaction can be calculated and displayed as a visual aid (see our Fig. 1). These residuals reveal that in both studies, the high-dissociation group recalled fewer trauma and more neutral words than the low-dissociation group. When the pure interaction effects are graphed, the two replications of our hypothesis become apparent.

Devilly et al. often emphasize that the interaction effect was the hypothesis at issue—for example, when they (incorrectly) state: “Although there was an interaction effect in DePrince and Freyd’s studies, our studies did not show this interaction” (p. 214) and “We did not find a significant interaction between DES [Dissociative Experiences Scale] group and word type for any of the three attention conditions” (p. 213). However, Devilly et al. also report meta-analyses for several simple main effects (i.e., recall of trauma words minus recall of neutral words within each of two conditions and two groups); it appears that they took the

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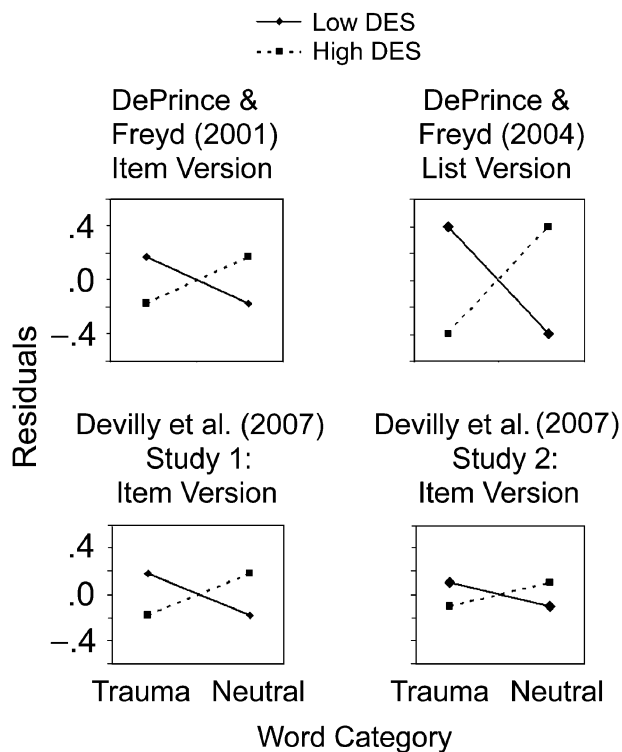


Fig. 1. Pure interaction residuals for Studies 1 and 2 of Devilly et al. (2007), as well as DePrince and Freyd (2001, 2004). The labels “Low DES” and “High DES” refer to groups as defined by scores on the Dissociative Experiences Scale. “Item” and “List” refer to two different ways to administer the directed-forgetting task; in the item version, the instruction to remember or forget is presented after each word, and in the list version, the instruction is presented after a list of words.

patterns in these simple effects to indicate a lack of support for the interaction hypothesis. These analyses raise interesting questions, such as whether highly dissociative individuals generally recall fewer trauma words than neutral words. Such a comparison, however, is heavily influenced by the recall base rates of experimental words and, therefore, by such ancillary features as how interesting and frequent words are. Our actual hypothesis is orthogonal to these base-rate effects. Whatever a low-dissociation group’s difference in recall of trauma words minus neutral words (e.g., -5 in one study, $+1$ in another study), a high-dissociation group’s difference must be lower (e.g., -6.5 in the first study, -2 in the second study). Only the statistical interaction, and no simple effect, tests this hypothesis.

Certain formulations in our original studies may have contributed to confusion here. For instance, we (DePrince & Freyd, 2001) wrote that “a significant interaction revealed that high DES participants recalled fewer trauma words and more neutral

words . . . than low DES participants who recalled more trauma and fewer neutral words” (p. 76). We did not include the phrase “after removing main effects . . .” to most explicitly mark that we interpreted only the interaction term. In 2004, we (DePrince & Freyd) wrote: “High dissociators recalled more neutral and fewer trauma words than low dissociators” (p. 490). We should have added that low dissociators showed the opposite pattern, to make explicit that the interaction reflected the pattern of data across all four cells. Perhaps such explicit markings would have prevented the misunderstanding that simple effects can test the relevant hypothesis.

SUMMARY

Deville et al. (2007) state that their results are a “lack of replication” of our 2001 and 2004 findings. In reality, the new data demonstrate two replications in studies that were underpowered. The effect sizes observed in these new studies are very similar to those previously observed using the comparable item procedure. When the two studies of Devilly et al. are combined to regain appropriate power, the interaction effect is replicated. Whether one looks at the two new studies or all four studies, there is strong meta-analytic confirmation of content-specific differential recall by high- versus low-dissociative individuals in undergraduate samples.

REFERENCES

- DePrince, A.P., & Freyd, J.J. (1999). Dissociative tendencies, attention, and memory. *Psychological Science, 10*, 449–452.
- DePrince, A.P., & Freyd, J.J. (2001). Memory and dissociative tendencies: The roles of attentional context and word meaning in a directed forgetting task. *Journal of Trauma & Dissociation, 2*, 67–82.
- DePrince, A.P., & Freyd, J.J. (2004). Forgetting trauma stimuli. *Psychological Science, 15*, 488–492.
- Deville, G.J., Ciorciari, J., Piesse, A., Sherwell, S., Zammit, S., Cook, F., & Turton, C. (2007). Dissociative tendencies and memory performance on directed-forgetting tasks. *Psychological Science, 18*, 212–217.
- Freyd, J.J., Martorello, S.R., Alvarado, J.S., Hayes, A.E., & Christman, J.C. (1998). Cognitive environments and dissociative tendencies: Performance on the Standard Stroop Task for high versus low dissociators. *Applied Cognitive Psychology, 12*, S91–S103.
- Rosnow, R., & Rosenthal, R. (1989). Statistical procedures and the justification of knowledge in psychological science. *American Psychologist, 44*, 1276–1284.

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