Measuring automatic retrieval: a comparison of implicit memory, process dissociation, and speeded response procedures

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Abstract

Using the stem completion task, we compared estimates of automatic retrieval from an implicit memory task, the process dissociation procedure, and the speeded response procedure. Two standard manipulations were employed. In Experiment 1, a depth of processing effect was found on automatic retrieval using the speeded response procedure although this effect was substantially reduced in Experiment 2 when lexical processing was required of all words. In Experiment 3, the speeded response procedure showed an advantage of full versus divided attention at study on automatic retrieval. An implicit condition showed parallel effects in each study, suggesting that implicit stem completion may normally provide a good estimate of automatic retrieval. Also, we replicated earlier findings from the process dissociation procedure, but estimates of automatic retrieval from this procedure were consistently lower than those from the speeded response procedure, except when conscious retrieval was relatively low. We discuss several factors that may contribute to the conflicting outcomes, including the evidence for theoretical assumptions and criterial task differences between implicit and explicit tests.

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1. Introduction

Several procedures have been developed in an attempt to identify the contributions to memory performance of automatic retrieval processes—retrieval of previously studied information with no intent to do so. These include implicit memory tasks (Graf & Schacter, 1985; Schacter, 1987), the retrieval intentionality criterion (Schacter, Bowers, & Booker, 1989), and the process dissociation procedure (Jacoby, 1991, 1998). The utility of each has been challenged on several grounds. For example, Jacoby (1991) and Richardson-Klavehn and Bjork (1988) noted that parallel effects of variables on implicit and explicit tests may indicate contamination of implicit performance with conscious retrieval. In terms of the retrieval intentionality criterion, Richardson-Klavehn, Gardiner, and Java (1996) argued that conscious retrieval is not a necessary consequence of awareness of the episodic history of an item (Graf & Komatsu, 1994; Roediger & McDermott, 1993). Finally, some of the theoretical assumptions of the process dissociation procedure have been questioned (e.g., Bodner, Masson, & Caldwell, 2000; Horton, Wilson, & Evans, 2001; Joordens & Merikle, 1993; Richardson-Klavehn et al., 1996).

Horton et al. (2001; Vonk & Horton, in press; Wilson & Horton, 2002) described an alternative procedure that uses RTs to identify retrieval strategy. The speeded response procedure is based on the assumption that automatic retrieval executes faster than conscious retrieval (de Houwer, 1997; Reingold & Toth, 1996; Richardson-Klavehn & Gardiner, 1995, 1996, 1998; Toth, 1996; Vaterrodt-Plünnecke, Krüger, & Bredenkamp, 2002; Weldon & Jackson-Barrett, 1993; Yonelinas & Jacoby, 1994), and we have reported data to support this assumption (Horton et al., 2001; Wilson & Horton, 2002). Following a study task, subjects in a speeded response group first received practice stem completion tests in which none of the stems corresponded to studied items. Their instructions were to respond as quickly as possible with the first word that came to mind. To increase response speed, average RTs were presented to subjects at the end of each test and faster responding was encouraged on the subsequent test. Because subjects were encouraged to respond quickly and no stems corresponded to the studied items, subjects had no basis for adopting conscious retrieval on the practice tests. These design features were implemented to maximize the likelihood that conscious retrieval strategies would be excluded. The critical stem completion tests immediately followed the practice tests with the only difference being that, on the critical test, 50% of the stems corresponded to studied items. Although it would be possible to switch to conscious retrieval on the critical tests, a comparison of speeded response group RTs with those from a baseline group and an explicit group argued against that conclusion.

Subjects in the baseline group performed exactly the same tasks as subjects in the speeded response group except that none of the stems on the critical test corre-