

Prospective Memory

Theory and Applications

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COMMENTARY

**Prospective Memory and
Episodic Memory**

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The study of prospective memory is booming. As Kvavilashvili and Ellis (this volume) note, psychological meetings have whole sessions devoted to the topic, papers on it appear regularly in the journals, and now an entire book is devoted to it. They also point out that the actual number of empirical and review papers is still rather small—they count about 45. Even assuming that by the time this book is published the number will have increased to, say, 60 or so, the amount of information would still be manageable, relative to a number of other topics in cognitive psychology. A person could still spend 2 weeks in the library and master the extant literature. As most of the authors in this section point out, although the study of prospective memory enjoyed a promising beginning, much (even most) remains to be learned on this topic. Researchers in this area are beginning to understand the topic, but are in no danger yet of completing the job. The aim of the present commentary is to assess the progress made to this point. On balance, it is impressive, with researchers developing new paradigms and with interesting findings arising from them.

The study of prospective memory has really taken off in the past decade, but it is not the only new trend. Another topic that has seen an explosion of interest in our field since the mid-1980s is the study of implicit memory, where researchers are interested in the unintentional retrieval of past events (Roediger & McDermott, 1993; Schacter, 1987). Implicit memory measures are contrasted with explicit measures, those in which subjects are asked to recall or to recognize events from their pasts. In implicit tests, retrieval of the past is incidental to performance of some task, but may nonetheless aid or prime that

performance. Like the explicit–implicit division, the distinction between retrospective and prospective memory tasks contrasts a set of tasks that have been studied for a long time (i.e., retrospective memory tasks) with ones that are new (i.e., prospective memory tasks). Indeed, retrospective memory tests are explicit memory tests. It is prospective tasks and implicit tests that are the exciting new ones to which attention is devoted, although the aims of researchers using implicit and prospective tests differ.

Implicit memory tests assess the incidental (Roediger & McDermott, 1993) or automatic (Toth, Reingold, & Jacoby, 1994) retrieval of past experiences, which can be accomplished even by brain-damaged subjects rendered amnesic (e.g., Warrington & Weiskrantz, 1970). Prospective memory tests assess the accomplishment of intended actions in the future, which require conscious processes that are not automatic, require capacity, and are severely impaired in patients with memory disorders. So it is clear (and no surprise to anyone) that the processes involved in prospective memory tests are quite different from those underlying implicit memory tests. Of course, Goshke and Kuhl (this volume) do show a parallel effect of intentions on episodic recognition and primed word fragment completion for words related to that intention, but even then they attribute the effect to common aspects between the tests.

The energy fueling the study of implicit memory is different from that sustaining prospective memory research. The grail for which researchers interested in implicit memory strive is dissociations or differences between implicit and explicit tests. These researchers are never so happy as when they can manipulate an independent variable or subject variable and observe different patterns of performance on explicit and implicit tests, thereby indicating that the laws of the two are different. An independent variable such as level of processing (a graphemic, phonemic or semantic orienting task during study) often has a great effect on an explicit test, but little or no effect on an implicit test with degraded perceptual cues (Graf & Mandler, 1984; Jacoby & Dallas, 1981; Roediger, Weldon, Stadler, & Riegler, 1992). Other variables such as modality (auditory or visual presentation) create the opposite pattern of effect: On visual implicit memory tests with degraded cues, there are large effects of this variable, but on long-term recall and recognition tests, there are usually no effects (e.g., Jacoby & Dallas, 1981; Roediger & Blaxton, 1987). Finally, the most interesting pattern is when the same manipulation produces opposite effects on the two types of test. For example, generating words from conceptual clues (e.g., producing a synonym to the clue *avaricious*–*g*___), relative to reading the words (*greedy*), generally enhances recall and recognition on explicit memory tests but creates less priming on perceptual implicit memory tests (Blaxton, 1989; Jacoby, 1983). Similarly, study of pictures produces higher rates of performance than does study of words on most explicit tests, but words produce greater priming than do pictures on verbal implicit tests with perceptually degraded cues (Weldon & Roediger, 1987; Weldon,

Roediger, Beitel, & Johnston, 1995). These are the sorts of findings that titillate researchers of implicit memory and about which their theories revolve. Dissociations or differences between explicit and implicit tests abound and are greeted with excitement; similarities between tests generally draw yawns.

The situation in the study of prospective memory is quite different. As I read the chapters, I was struck at how many findings from the study of prospective memory are of the same general kind as from studies of retrospective memory. Let us consider some examples. Einstein and McDaniel note that retrieval cues aid recall of intentions in prospective tasks, that distinctive and specific encodings aid later performance, that performing prospective tasks requires mental capacity, and that one must consider both trace dependent and cue dependent processes (Tulving, 1974) for a good understanding of prospective memory phenomena. These are all factors that play critical and similar roles in *retrospective memory tests*. In a similar vein, Mäntylä (this volume) maintains that both encoding and retrieval factors are important to understanding prospective memory and that Zeigarnik effects and “spontaneous” retrieval processes occur in both prospective and retrospective tasks. Kvavilashvili and Ellis (this volume) note that important intentions are better remembered than unimportant ones, that a short-term–long-term distinction is critical in understanding prospective memory, and that forgetting of intentions may be caused by interference from interpolated activities. All doubtless true conclusions, but none is different from generalizations drawn from studying retrospective memory.

At least in the chapters under review here, there are no cases of principles emerging that would cause us to change our thinking about how memory works or to believe that prospective tasks fundamentally differ from retrospective tasks. The manipulated variables generally have parallel effects on prospective and retrospective tests. There is nothing wrong with this state of affairs, and we may even take comfort that what we have learned in one domain (studies of retrospective memory) extends so well to a new domain (prospective memory tasks). But, more critically, we can ask: If retrospective memory (in its usual laboratory manifestation) is the study of lists of events from subjects' pasts, is the study of prospective memory any more than the study of “lists of things to do” in the future? Is prospective memory just another form of episodic memory? If so, it would be no surprise that the normal study of episodic (i.e., retrospective) memory has led to the same principles as studies of prospective memory, because the two are really the same, or at most, slight variations on the same entity. If prospective memory is the mental equivalent of a person's list of “things to do,” then why get excited about this new way of studying episodic memory?

Now I hasten to add several provisos here. First, some differences were reported. Koriat, Ben-Zur, and Nussbaum (1990) showed that tasks subjects expected to perform were remembered better than tasks they only expected to

recall. This is similar to Goschke and Kuhl's (this volume) finding that words from scripts that subjects expected to act out were recognized more quickly than were words from control scripts. However, in both these cases the difference between events to be recalled and those to be performed was a main effect that could be interpreted as showing better encoding, storage, or retrieval of information. Because no interactions were shown between prospective (to-be-performed) and retrospective (to-be-recalled) items, the simplest interpretation of the difference is in terms of encoding or storage differences.

Second, as already discussed, researchers are just starting the study of prospective memory and the surprises may lie in the future. The early studies used variables familiar from past (retrospective memory) research and they generalize well, so far, to prospective memory research. But other variables, as yet unexplored, may produce differences (or dissociations) between prospective and retrospective memory tasks. As Ellis (this volume) and Kvavilashvili and Ellis (this volume) note, the range of approaches to the study of prospective memory has thus far been rather narrow. As the latter authors characterize the situation, "it would appear that all [studies of prospective memory] have investigated the following: neutral, relatively unimportant, episodic, pure, pulse, mostly one-stage, momentary intentions, generated by other people (usually an experimenter) and formed as the result of simple decisions." Kvavilashvili and Ellis describe many interesting variables that seem likely to be important to the understanding of prospective memory, but unfortunately most have not been studied by them or by anyone else. In some cases, it is difficult to imagine how the variables Ellis discusses can be studied, but we feel sure that clever researchers will do so in the future. This future research may turn up the interesting new principles that have thus far eluded researchers in this area.

If differences between prospective and retrospective memory are not fueling the spate of research in this area, what is? My guess is that, in part, the problem seems so new and different, even if the research has not yet shown it to be. Prospective memory tasks are representative of everyday memory functioning. We all have commitments to remember in our lives, whether externally or internally imposed—people to call, meetings to attend, pills to take, papers to review, and on and on. These things to do in the future do seem different from the things that happened in the past, and, as Koriat et al. (1990) showed, they are remembered well. Therefore, the study of prospective memory is on firm ground whether or not new principles emerge from its study.

Ellis (this volume) eschews use of the term prospective memory as being too narrow. She prefers to write of "realizing delayed intentions" as being broader and covering more territory. Current study of prospective memory usually involves subjects accomplishing tasks the experimenter told them to do in the future, at certain times or at the appearance of certain cues. The researcher measures whether or not (and how accurately) subjects accomplish what they are told to do. Ellis notes that people's intentions often go far beyond such mundane obligations to perform. Delayed intentions include things

we should or must do—what researchers study now—but also include things we want to do, hope to do, wish we might do, and so on. If we take this broad view, then not surprisingly memory processes become less important and many other cognitive processes (such as planning and problem solving) become more crucial. In addition, the study of motivation and emotion becomes as critical, or more critical, than the study of memory.

As I gaze over to my bookcase in my home office, I spot at least 30 books sitting on the shelves, waiting to be read. Surely when I purchased those books I intended, at some level, to read them. Is the fact that they are unread a failure of prospective memory? After all, I did not follow through on my intention to read the books I bought. Similarly, for years I planned to write a grant proposal with one of the editors of this book. We even outlined two proposals that, so far, remain unwritten. Once again, we failed to realize intentions. But I suspect that these failures and many others are common occurrences, and agree with Ellis (this volume) that it would be wrong to construe them as failures of prospective memory. We remember the commitment, but have not executed it.

This issue—the breadth of the area of inquiry—leads us back to the problem of definition: How should the definition of prospective memory be circumscribed? I do not claim to be an expert in solving this problem, but my guess is that it is best to start with a narrow definition (as has so far been the case) and then gradually expand it. I would limit the study of prospective memory to those tasks that a person feels compelled to do, the ones he or she must do. If people accomplish these tasks on cue, we can clearly judge them correct and if they do not, we can mark them for an error. This definition has been the one to guide most past research and it has created an interesting body of work. If all intentions are included in the study of prospective memory, however—hopes and wishes and dreams—then the study goes beyond that of prospective memory and may have little in common with it, as we narrowly defined it.

I do not believe I am disagreeing with Ellis in any major way in the previous remarks. Certainly the study of how people plan their futures—what their intentions are and how they are or are not realized—is a fascinating one and little studied, at least by cognitive psychologists. And I would agree with Ellis that it cannot be covered under the rubric of prospective memory. Such studies would likely draw as much or more on social psychology than on cognitive psychology. It would seem wise to keep such studies distinct from experiments on prospective memory, as typically defined.

Goschke and Kuhl (this volume) are among the first to study a factor that probably occurs to everyone reading about prospective memory: Are there individual differences among people (besides age) in carrying out intended tasks? Their questionnaire sorting people into state-oriented and action-oriented types impressively correlated with at least their recognition results. How is this personality measure related to other psychological tests, such as those measuring intelligence or need for achievement or various other personality scales or pathologies (e.g., obsessive-compulsive disorder). In our

daily experiences we all know that some people carry through and do what they say they will do, whereas others, seeming to believe their commitments at the time, seldom follow through. What variable or variables predict those who are good at prospective memory and those who are not, assuming the tasks are ones to which people have committed themselves? Of course, along with Ellis, we suspect that memory variables are not the only relevant ones in explaining some of these differences, but rather social–personality factors control the variance.

The study of prospective memory may still be in its infancy, or at least in its toddler period, with basic definitions, methods, and terminology still unresolved. I would like to end by making one strong recommendation, which should resonate with psychologists who study learning and memory and who know about retroactive and proactive interference. People should be forbidden from referring to prospective memory by the abbreviation PM (as in some of the chapters under review). The initials PM already have a standard meaning in our field, primary memory. Unless researchers interested in prospective memory want to create havoc in the minds of older readers—anyone in the field in the 1970s—they should abandon the practice of referring to prospective memory as PM. The same is true of those who would refer to retention interval as RI, because using RI in this way creates RI in the original sense. In fact, it seems surprising that anyone—but particularly psychologists studying memory—would suggest PM and RI as abbreviations for terms besides primary memory and retroactive interference. However, psychologists in our field have a long history of creating names of tasks or phenomena, and acronyms for them, that are unfortunate. Remember MMFR for modified modified free recall? Surely a bad name for the task—it was not even free recall, for one thing—and the name created a bad acronym. But we do not need to create interference by deliberating picking new abbreviations that already have a standard meaning. Recall the lesson of levels of processing and interference theory research—give terms deep, meaningful names, but ones that are not already in use. However, my favorite example of terminological problems grows out of the levels of processing work. Craik and Lockhart (1972) imbued in us the need for deep, meaningful processing and they distinguished two types of processing. What names did they give them? Type 1 and Type 2! So there is a long history of poor choices of terminology in our field. But let us stick our finger in the dike over PM for prospective memory.

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