

An Activity Theory Approach to Memory

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The articles which follow report independent research that originated in a collaborative group now organized as the Laboratory for Cognitive Studies of Work. Laboratory members are collectively engaged in working out a conceptual framework for cognitive research based on activity theory. Beach and Stevens, together with Scribner, elaborated this framework in the domain of memory, and in this introduction we will briefly sketch its principal implications for the ecological study of memory.

ECOLOGICAL APPROACHES TO MEMORY

Over the past decade ecological investigations of memory have come to play an increasingly important role in memory research. Today it is difficult to find a psychologist who, on some level, does not acknowledge the importance for psychology of locating and describing memory phenomena in everyday life. We are hard-pressed, however, to find agreement on the particular contributions such research is expected to make to our understanding of memory processes. An article by Bruce (1985a), responses by Neisser (1985) and Hirst and Levine (1985), and a reply by Bruce (1985b) illustrate the principal lines of disagreement. A more recent series of articles initiated by Banaji and Crowder (1989) and responded to by Loftus (1991), Conway (1991), Ceci and Bronfenbrenner (1991), Morton (1991), Neisser (1991), Roediger (1991), Tulving (1991), Klatsky (1991), and Bruce (1991) continue the debate.

As we see it, three methodological approaches can be distinguished. Some psychologists (Crowder, 1976; Nakamura, Graesser, Zimmerman, and Riha, 1985) are interested in ecological research as a way of validating principles of memory obtained in laboratory studies. This approach assigns special status to the laboratory as a 'privileged' site for memory research, but reflects a concern to test the validity of

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laboratory studies in the 'real world'. A second group (Baddeley, 1982; Bahrick, 1984) is interested in investigating everyday memory phenomena as a means of extending and modifying a laboratory-based body of knowledge of memory. Both life settings and laboratory settings are considered to contribute valid but differential information about memory structures and functions. A third group (Neisser, 1978; Winograd, 1988) asserts that general principles of memory should grow out of an understanding of the ecology of everyday memory. This approach gives memory beyond the laboratory special methodological status. Erlich (1979), for example, suggests that ecological studies are necessary as a means of overcoming basic scientific distortions within the discipline of psychology:

Psychology has not benefited as have physics or biology from several centuries of observations that have contributed to identifying the most important biological and physical problems. The study of psychology was prematurely involved in overly theoretical and experimental systematization. This is perhaps a disadvantage (Erlich, 1979, pp. 199–200).

Crosscutting methodological approaches is a more basic controversy that is reflected in opposing theoretical commitments to the study of psychological phenomena, including memory. The controversy has appeared variously as mind–body, subject–object and person–environment dualisms (Bakhurst, 1988). Some memory researchers (Anderson and Bower, 1973; Anderson and Ross, 1980; Anderson and Schooler, 1991) make theoretical commitments to memory structure as located within the confines of the head. Some (Halbwachs, 1980/1950; Middleton, 1987; Harris, 1978) focus on mnemonic structures distributed across the social and physical environment beyond the individual. Others (Neisser, 1978; Gibson, 1966) take an interactionist position in which the environment structures memory and possibly even originates distinctions between episodic, semantic and procedural memory. At the same time we arrange the environment to support our memory. All of these positions build on different aspects of the same core internal–external dualism.

ASSUMPTIONS OF ACTIVITY THEORY

Now we can locate the principal contributions which we think an activity approach to memory makes. This theory, an outgrowth of the work of Soviet psychologist, L. S. Vygotsky (Vygotsky, 1978; Minick, 1985; Scribner, 1985; Wertsch, 1985; Vygotsky, 1988) attempts to overcome subject–environment dualism by concentrating on an analysis of the life processes which unites them. A major tenet of this theory, as elaborated by Leont'ev (Leont'ev, 1972/1981, 1981; Wertsch, 1981; Kozulin, 1986; Davydov, 1990) is that the appropriate unit of analysis for the study of human behaviour and cognition is a dynamically organized system of activity through which humans seek to accomplish their purposes. Activity is the

... nonadditive, molar unit of life for the material corporeal subject. In a narrower sense (i.e. on the psychological level) it is the unit of life that is mediated by mental reflection. The real function of this unit is to orient the subject in the world of objects. In other words, activity is not a reaction or aggregate of reactions,

but a system with its own structure, its own internal transformations, and its own development (Leont'ev, 1981, p. 46).

Activities may be as diverse as work, play and education (among others) but all have in common the characteristics that they call for an integration of mental and behavioural processes directed at satisfying specific goals.

One of the earliest lines of empirical investigation conducted by the founders of activity theory was in the area of memory. In the 1940s Istomina (1975/48), as student of Vygotsky, conducted a landmark study of the development of memory, demonstrating its dependence on the content and structure of particular activities. She organized a nursery school play activity, 'going to the store', which required young preschoolers to remember a predetermined shopping list, and she compared their recall in this activity with that in the standard free-recall paradigm. She found that a shift from involuntary to voluntary memory first occurred during the play activity in which mnemonic goals were integral to the fulfilment of the purpose of the activity, rather than ends-in-themselves as in the free-recall task. At the same time, children's recall increased in both activities as they gained greater understanding of the distinctive function of mnemonic goals. She concluded that the two activities (play and laboratory task) differentially afford the construction of mnemonic goals, and through this the development of strategies in the shift from involuntary to voluntary memory.

Zinchenko's (1962/1981) later research on involuntary memory examined a principal claim of activity theory: that increased practice with particular goal-directed actions can engender their transformation into the means for carrying out other actions. Zinchenko speculated that involuntary memory should be poorer for information associated with the means of an action than for information associated with a conscious goal. He presented children and university students with tasks that required solving arithmetic word problems or first constructing and then solving the problems. After problem-solving, participants worked on a distractor task for several minutes and then were asked, without warning, to recall problems including the numbers involved. University students recalled more numbers after having solved problems that they themselves had devised than after solving problems devised by the researcher, but in a startling reversal of most developmental findings, they recalled fewer numbers from either set of word problems than did first- and second-graders. Grade school students' recall scores were equivalent across the two types of problems. For them, arithmetic calculations in both types of problems were goal-directed actions that required conscious attention. Their calculations, unlike those of the university students on the solving-only problems, had not become automatic, nor did they rely on precalculated solutions. Zinchenko's research demonstrated that differences in involuntary memory performance depend on how the subject engages information in an activity—whether at the level of actions or at the level of means to carry out other actions—as well as on the content and structure of the particular activity.

These investigations illustrate the three principal contributions we think activity theory makes to the study of memory. First, instead of focusing on either memory structures in the head or memory structures in the environment, activity theory holds that human activities encompass the mutual construction of both. It is our uniquely human societal ability that produces a world full of symbolic and technological objects. These objectively exist as our heritage, and can be remembered and acted

upon, modifying ourselves in the process (cf. Scribner, 1986). In taking such a view, activity theory proposes that structures in the environment assist in shaping memory processes and that memory affects how we structure the environment around us. By focusing on either constructive process to the exclusion of the other, as competing roles for ecological studies of memory have tended to do, memory is directed to one side or the other of a Cartesian mirror between memory as mental process and memory as object. By shifting the focus of memory research away from dualism, activity theory requires us to study memory as a part of how we transform our natural habitat into one with social meaning, and through this process, how the material environment becomes a possible object of memory.

The studies by Beach and Stevens in this volume indicate that it is the societal structuring of the particular work activity as well the person's momentary adaptations to changing circumstances that selects the relevant strategies and environmental structures for memory functions.

Second, all activity-based studies are 'ecological' in that human activities, wherever they occur, satisfy particular goals that are formed and invoked in that setting. No particular method or location is given privileged status independent of the particular research question being asked. This reflects the fact that activity theory is not specifically organized around issues of memory, and therefore does not automatically assume much of the locational and methodological baggage that accompanies it. Any delineation of memory as a process or a division of memory into its subcomponents must therefore be reasoned on theoretical grounds with respect to the ecology of the particular activity being examined.

The studies by Beach and Stevens employ varying combinations of observational, ethnographic, and experimental methods adapted from portions of Scribner's (1984) three-phase research strategy of observation, on-site experiments, and simulation experiments. These different combinations reflect both the different activities they are used to examine (bartending, and working as a waitresses), as well as the different questions they ask about memory. Beach moves from observation to participant-observation ethnography to an experimental simulation. Stevens moves from participant-observation to a controlled observational study.

Third, activity theory views memory as both a social and a cognitive process. It can no more meaningfully be separated into its cognitive and social components than table salt can be separated into sodium and chloride while retaining its saltiness, to borrow an analogy from Vygotsky. That which is experienced socially is cognitively re-experienced in a newly reorganized form, which in turn affords the modification of social forms. At the same time, activity theory allows memory to be analysed both at the societal level, as in Halbwachs's (1980) study of collective memory and at the personal level, as in recent studies of autobiographical memory (Wagenaar, 1986) without reducing one level to the cause of the other. They each involve different explanatory principles, span different time frames, and possess different courses of development.

The studies by Beach and Stevens included in this volume explicitly focus analyses on the personal rather than on the collective societal level of memory process. The three studies are also explicit about indicating that an activity mediates between society and the person. In doing so the activity affords the development and deployment of particular mnemonic techniques and, over another time frame, develops environmental structures that assist memory.

Memory is rarely an activity in and of itself, except perhaps for mnemonists and memory researchers. A person's memory therefore always has a partially shared developmental ecology with the activity it is deployed to serve. The studies by Beach and Stevens provide new insights into this relation.

DEDICATION

This article and the two studies which follow are dedicated to the memory of Sylvia Scribner. Her tragic and untimely death is an immeasurable loss to the field.

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