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Cognitive conceptions of language and the development of autobiographical memory

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Abstract

The early development of autobiographical memory is a useful case study both for examining general relations between language and memory, and for investigating the promise and the difficulty of interdisciplinary research in the cognitive sciences of memory. An otherwise promising social-interactionist view of autobiographical memory development relies in part on an overly linguistic conception of mental representation. This paper applies an alternative, 'supra-communicative' view of the relation between language and thought, along the lines developed by Andy Clark, to this developmental framework. A pluralist approach to current theories of autobiographical memory development is sketched: shared early narratives about the past function in part to stabilize and structure the child's own autobiographical memory system. © 2002 Published by Elsevier Science Ltd.

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1. Introduction: learning to remember

The 12-year-old son of a developmental psychologist looked up from his homework to ask his mother's help with a writing assignment, asking "Mom, what is my most important memory?" (Engel, 1999, p. 24). How can another person have direct and intimate access to my most significant memories? Autobiographical memory for events in the personal past is a capacity which develops in a shared environment. Its content as well as its expression is influenced by that context. From its initial stages in the pre-school years, autobiographical memory grows out of interpersonal exchanges.

Developmental studies are a rich and flourishing area within the sciences of memory. Despite great variety in methods and assumptions, most schools of developmental

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thought are thoroughly interdisciplinary, calling to different degrees on neuropsychology and social psychology as well as on cognitive psychology; and most accept, in some explanatory contexts at least, the significant causal influence over time of the remembering environment. Learning to remember in company, or joint reminiscing, is one of the core forms of shared attention in childhood, a form which is directed specifically towards the past even when it also serves current or action-oriented purposes.

"Autobiographical memory" (AM), often called "personal memory" by philosophers, refers to explicit recollections of past events and episodes in a personal history. Although consensus on a more precise working definition is surprisingly hard to find, a fairly orthodox account is that of William Brewer (1996), who sees AM as a reliving or reviving of my own past phenomenal experience, with the additional knowledge that I've had that experience before. Perner (2000, p. 307) sees AM as a more sophisticated capacity, which "entails a reflection on past events *as* past events, as events that one knows (conscious, explicit memory) and as personally experienced (episodic, autonoetic memory)".[1]

Just how might the sharing of memories, both in language and in non-linguistic practices,[2] influence the organization of early AM? An approach to the question, I suggest, requires tighter integration between the developmental psychology of memory and general cognitive scientific inquiry into the nature and the vehicles of mental representation. Current views in the developmental literature, however, look on initial examination to be in some tension with prevailing assumptions in cognitive science about the priority of thought over language. In this paper, then, I sketch an inchoate interpretation of the two fields, and of possible relations between them, which might be mutually beneficial.

Specifically, I want to apply to memory research one particular cognitive conception of language, the 'supra-communicative' view recently developed by Andy Clark and others: on this view, language is "the ultimate artifact", the supreme human tool not just for communicating thoughts, but for thinking (Clark, 1997, chapter 10). Clark's vision of language as a powerful form of cognitive 'scaffolding' draws on developmental research influenced by the Soviet psychologist Lev Vygotsky, whose work also inspires the 'social-interactionist' school of AM research. This important group, which includes Robyn Fivush, Katherine Nelson, and others, argues (in the extreme) that "early reminiscing begins as an interpersonal process

[1] Decisions on how to describe autobiographical memory relate to difficult theoretical issues, notably about time and memory (Section 3 below), but also about the relations between autobiographical and episodic memory, and about memory in non-human animals. Autobiographical and episodic memory may come apart: I can have semantic memory for autobiographical facts, and on some views (Nelson, 1993) autobiographical memories are only a particularly significant subset of episodic memories. But in this paper I discuss the core cases in which the categories overlap. For more discussion see Section 3 below and Sutton, 2002. For a range of views about memory in other animals see Campbell (1994, pp. 37–41, 64–71), Griffiths, D. et al. (1999), Tomasello (1999, pp. 124–5), Dennett (2000), McCormack (2001).

[2] Although I only discuss possible cognitive effects of language on memory here, the view developed should also encourage attention to practical and non-linguistic influences of the interpersonal and material environment on individual memory.

and only becomes intrapersonal over time'' (Engel, 1999, p. 27). They thus set the study of culture, narrative genre, and personality in the child's linguistic environment at the heart of the investigation into the origins of AM. In a sense, then, given this shared intellectual heritage, I am not even trying to link two distinct frameworks, but simply to render shared commitments explicit.[3]

After a brief description of the context of this project in a broader inquiry into interdisciplinarity in memory research, I fill in a richer account of the significance of AM (Section 3), before I introduce Clark's 'supra-communicative' or developmental systems view by locating it in a range of cognitive conceptions of language (Sections 4–5). In Section 6, I identify a problem for the otherwise promising social-interactionist approach to AM development, arguing that it is compatible with a less linguisticized vision of the format of mental representation than its proponents currently prefer. The final section then applies the supra-communicative view to memory development, sketching a pluralist causal framework which gives language and narrative practices their full developmental weight without projecting the form of external symbol systems back on to the organization of the AM system itself.

This attempt to use AM development as a case study in interdisciplinary theory-construction, and in understanding the relation between language and memory, inevitably ranges too superficially over a number of distinct specialist subdisciplines. The aim is neither to offer a thorough survey of relevant empirical investigation, nor to pin down and argue finally for a specific and precise theoretical position. I intend instead merely to point out one way of forging connections between fields of cognitive science. Even if my particular interpretation of the common features does not convince, failing to address important empirical, psychoanalytic, or philosophical issues, I hope at least to offer resources for a legitimate form of interdisciplinary inquiry which may suggest fruitful further lines of research.

2. Interdisciplinarity in the sciences of memory

Apart from its intrinsic interest, the developmental study of AM is a vital hinge between neuropsychology, cognitive psychology, and social psychology. If, amidst the daunting array of current sciences of memory, we are ever to construct an integrated framework, this is as promising a place to start as any. The goal would not be the unification of all memory sciences by classical reduction, but the elucidation of local points of contact between different (sub)disciplines, in the search for interfield theories (Darden and Maull, 1977), or in pinpointing genuinely interdependent phenomena at different levels of explanation (Kitcher, 1992, pp. 6–7; Sutton, 2002).

A number of philosophers of psychology have taken other areas of the sciences of memory as case studies in interdisciplinary theory-construction. Kenneth Schaffner

[3] To the best of my knowledge, there is no specific discussion of the developmental psychology of memory in the work of Clark or his followers. Nor do the developmentalists studying AM refer to the general cognitive conception of language, the related 'extended mind' hypothesis, or to cognitive scientific debates about mental representation in general.

(1992) and John Bickle (1995, 1998) illustrate their new, liberalized conceptions of reduction with treatments of Kandel's neurobiological account of associative learning in the sea-slug *Aplysia*.[4] Lindley Darden, Carl Craver, and William Bechtel address the ways neuropsychologists and neurobiologists think of levels, mechanisms, and decomposition in the study of spatial memory and in the localization of memory systems (Craver and Darden 2001; Craver forthcoming; Bechtel 2001). Valerie Hardcastle constructs a detailed narrative of the integration of interdisciplinary traditions, methods, and theories in the development of the distinction between implicit and explicit memory systems (1996, chapter 6). But whereas these writers address the relations between the neural and the cognitive sciences of memory, there has been little work on cognitive psychology's relations with the personality, developmental, or social psychology of memory. Developmental studies in particular are ripe for such investigation, because of their key role in the forging of a broad consensus across cognitive psychology in the 1990s about the constructive nature of remembering, and the importance of the context of retrieval.

A number of difficult questions about interdisciplinarity can be fruitfully raised in the specific case of the study of memory. Even if cognitive science is still "a mere babe in the woods of science" (von Eckardt, 1999, p. 221), the cognitive sciences of memory nevertheless harness a vast institutional, technological, and textual apparatus more typical of Kuhnian normal science than of an entirely pre-paradigmatic era. We can ask, for example, to what extent memory is typical in its susceptibility to interdisciplinary analysis. The methodological problems of investigating early AM might be compared on the one hand with those which beset research into children's dreaming (Foulkes, 1999), and on the other with the more successful interdisciplinary exchange which has characterized research on colour categorization (Dedrick, 1998). But the potential pitfalls of interdisciplinary theory-construction are equally likely to emerge. In particular, we must recall the caution expressed by Patricia Kitcher (1992, pp. 172–4, 180–3) about the error of seeing the mere coherence and harmony of theories from different domains as conclusive evidence for the truth of both. With this timely warning in mind, though, we can proceed by restricting our ambitions to initial conceptual geography, rather than overhyped claims for immediate success.

3. The significance of autobiographical memory

It's in the autobiographical form of episodic memory that we achieve a form of "mental time travel", in which we're oriented to events as occurring at particular past times, events which we sometimes knit into autobiographical narratives (Tulving,

[4] This example is given an *anti*-reductionist spin by Gold and Stoljar (1999), who do not refer to Bickle or Schaffner's interpretations. Their vision of reductionism is closer to a classical unity-of-science model. The fact that this kind of reduction is ruled out by continued reliance on psychological-level terms like 'habituation' and 'sensitization' in the putatively reducing theory does not, however, tell against weaker 'new-wave' conceptions of 'patchy' reduction.

1983, 1993, 1999; Suddendorf and Corballis, 1997). But what exactly is this capacity, and how does it arise?

Children start talking about the past "almost as soon as they begin talking", but the form of their references to past events develops rapidly over some years (Nelson and Fivush, 2000, p. 286).[5] At early stages, adults provide much of both the structure and the content of young children's references to the past, providing 'scaffolding' for the children's memories. Initially children use generic event memories implicitly, like scripts, as a basis on which to understand routines and generate expectations: they know what typically happens in certain repeated sequences of actions or events. But this is not yet a capacity to remember particular past events. It takes some time for children to acquire the ability spontaneously to refer to specific past episodes with rich phenomenal content. In Section 6 below I discuss the social-interactionist account of how these changes unfold, comparing it with differing views on the role of joint reminiscing. But first it's worth spelling out the psychological significance of the development of more mature AM capacities in a little more detail.

Children gradually develop perspectival temporal frameworks in which to locate memories of idiosyncratic events. Memory sharing practices, often initiated by adults, encourage the idea of different perspectives on the same once-occupied time (McCormack and Hoerl, 1999, especially pp. 173–4). In developing this temporal perspective-switching, children start to take memories as objects for negotiation, shared attention, and discussion. Realization of the existence of discrepancies between versions of the past goes along with the development of some kind of self-schema, as children begin to collect stories into some kind of personal history. The ability to view one's life retrospectively is sophisticated, and (initially at least) follows adult guidance in simpler conversations about the past.

Richer definitions of AM, as developed in different ways, for example, by John Campbell, Christoph Hoerl, and Josef Perner, drive strong pictures of the philosophical significance of AM in self-conscious thinking. If true AM is memory of what one saw and did, when and where, conceived as having a particular past time at which it took place, then it requires the subject to have a conception of the causal connectedness of both physical objects and the self. Children need to grasp that both world and self have a history, on such views, for genuine autobiographical remembering to get off the ground. For Campbell (1997), this suggests that temporal asymmetry is built in to AM, in that we are inevitably realists about the past, conceiving of past events as being all, in principle, integratable on a single linear temporal sequence. Various principles of plot construction thus ground our ordinary AM practices: we assume, for example, that the remembered I has traced "a continuous spatio-temporal route through all the narratives of memory, a route continuous with the present and future location of the remembering subject" (Campbell, 1997, p. 110).

[5] There are of course also a range of memory phenomena before language: for surveys of the methods used to study memory in infants, and current thinking about the results, see Mandler and McDonough (1997), Rovee-Collier and Hayne (2000).

We can, in mature AM, assign causal significance to specific events, so that our temporal orientation is by particular times rather than simply by rhythms or phases. For Hoerl (1999, pp. 240–7), this feature of our concept of time grounds our awareness of the singularity of events and especially of actions. We are thus "sensitive to the irrevocability of certain acts", so that we, unlike other animals and (perhaps) some severely amnesic patients, incorporate a sense of the uniqueness and potential significance of particular choices and actions into our plans and our conceptions of how to live.

These specific views about the significance of AM may be somewhat over-intellectualist. The psychological status of the putative principles of plot construction needs clarification, and the sophistication of this cluster of allegedly interconnected features of self-conscious thinking divides us from other animals to an extent which seems in some tension with naturalism. I sketch this provocative line of thought here merely to suggest what is at stake in defining AM and investigating its development. Weaker accounts of the requirements for AM will also have implications for the way we think of the unity and continuity of personal identity.[6] Developmental evidence may play an important part here, in suggesting ways of thinking about early temporal representation, and about the origin of personal narratives, which allow different roles to the early narrative environment in understanding the relation between memory and language. To find a path through to this possibility, we need to step back, and undertake a taxonomy of the tangled field of philosophical views on the relation between language and thought.

4. Language, thought, and memory: Some anti-expressivist options

The core information-processing assumption of cognitive science renders thought ontologically independent of public language. Whether your favoured picture of mental representation has us thinking in an innate 'Mentalese' or in some non-linguistic medium, the contents of mental representations are independent of the meaning of any natural language utterances. To put the point differently, legitimate disagreements *within* cognitive science over the question of whether thinking is *itself* linguistic in form have coexisted with general consensus that the key function of language is to act as a conduit or channel for the communication of thoughts.[7] I'll call the thesis that thinking is itself linguistic in form 'lingualism', following John

[6] Campbell argues that his views are compatible with empirical evidence of the fragmented or gappy nature of memory narratives (1997, p. 107). Philosophers who see the self as less stable and integrated need in response to do more than point to psychological consensus about the selective nature of AM (as does Schechtman, 1994): an alternative psychology of narrative time in AM is required.

[7] So, for example, Fodor (1999) and Cummins (1996), while disagreeing on almost everything else about mental representation, both see public language as primarily in the communication business, and claim that it does not (Cummins) or may not (Fodor) even genuinely *represent* at all. Both, in the current terminology, are expressivists: but Fodor is, while Cummins is not, also a lingualist. Full-blown expressivism is a firmly non-cognitive conception of language in the sense that it gives language no significant *cognitive* role.

Preston (1997, p. 1);[8] and I'll call the independent thesis that (to put it strongly) the primary function of natural language is (merely) to express or communicate thoughts 'expressivism', following Christopher Gauker (1999).[9] It's important to stress that there are also many intermediate views on each question.

Given this division of the issues, I will first point out that the general expressivist consensus has recently come under attack. I'll outline some varieties of anti-expressivism, the view that public language has important functions (notably cognitive functions) which are additional to its communicative functions. There are both lingualist and anti-lingualist routes to anti-expressivist cognitive conceptions of language. It's on this latter combination (anti-lingualism and anti-expressivism), as defended by Andy Clark and others sympathetic to recent dynamical movements in cognitive science, that I want to focus.

Again, I'm not here *arguing* against expressivism, but simply pointing out some anti-expressivist options which are in fact compatible with certain strands of cognitive science. In particular, the current developmental psychology of AM suggests a fairly strong variety of anti-expressivism. But if that's so, and if in this domain at least it turns out to be fruitful to reject expressivism, we can then ask whether the particular cognitive roles of language which influence autobiographical memory sit better with a lingualist or an anti-lingualist conception of the nature of representation in AM. As I've said, lingualism and expressivism are quite independent theses, and an anti-expressivist can consistently opt either for lingualism or for its denial. But I'll suggest that, to the extent they have taken a view at all, developmental psychologists of memory have in fact too easily slipped into lingualism. With a clearer picture of the conceptual terrain in play, it is equally plausible to interpret their variety of anti-expressivism as being also anti-lingualist.

An anti-expressivist, then, is someone who thinks that language has some direct roles to play in cognitive processing, over and above its obvious expressive functions.[10] Some argue that thought *conceptually* depends on language. For Gauker (1999), for instance, the *essence* of intentional states lies "in the role that talk of intentional states plays in the conduct of productive conversation": the primary function of thought, one might say, is to aid and abet language, rather than the reverse. As Gauker's claim suggests, such a priori rejections of expressivism tend to be anti-realist about the mental, and thus to sit in some tension with the cognitive scientific project, and with any inquiry into thought in non-human animals. But there are also empirically-grounded routes to anti-expressivism. Peter Carruthers, for instance, argues that natural language is the medium of conscious propositional conceptual thinking, and of domain-general thought and inference (2001, sections 4–6).

[8] Preston (1997, p. 1) quotes Socrates' account of thought as "a talk which the soul has with itself about the objects under its consideration" (Plato, *Theaetetus* 189e). As Preston acknowledges, lingualism can come in many different forms: in particular, lingualists disagree about whether the medium of thinking is natural language (Carruthers, 1996, chapter 2; 2001) or a quite different language of thought (Fodor, 1975).

[9] In Gauker (1994) 'expressivism' is called "the Lockean theory of communication".

[10] For a nicely detailed taxonomy of weaker and stronger ways of rejecting expressivism, thus understood, see Carruthers (2001, Sections 2–3).

Carruthers thus sees thought as *conceptually* independent of language, and allows that much thinking can occur without language: but he claims that a modularist take on cognitive processing, combined with attention to recent evidence about the integration of information across domains, suggests that as a matter of fact certain kinds of thinking require natural language. Carruthers' particular route to anti-expressivism is, then, specifically one which also commits him to lingualism.

Another lingualist route to anti-expressivism is the radical empiricist idea of language as mind-structuring. On the view sometimes denigrated as the 'Standard Social Science Model' of the mind (Pinker, 1996), thought is wholly structured, in both form and content, by the particular linguistic environment of the culture in which the mind grows. In controversies over colour naming, such views suggested that colour categories are entirely arbitrary labels, idiosyncratically derived in each linguistic community, applied to a fundamentally unstructured colour space. But, as Carruthers points out (2001, Section 3), the idea of the mind as a socio-linguistic construction is also implicit in Dennett's (1991) more biologically grounded view of the mind as a virtual Joycean machine. For Dennett, language colonizes the mind, reprogramming or altering the brain's modes of representation so that we come to think in ways quite different from those in which any creatures without language can think.

Many cognitive scientists have been uneasy with the apparently relativistic implications of strongly mind-structuring views of language. It has proved difficult to distinguish between stronger and weaker versions of the view, both in general and in specific domains like colour and memory: but there is live evidence in support of realistically weakened versions of the idea that there are certain specific linguistic effects on perception, memory, problem-solving, inference, and so on (for a range of views see Kay and Kempton, 1984; Hunt and Agnoli, 1991; Hardin and Banaji, 1993; Lucy, 1999). In the case of memory, the use of linguistic labels to remember (for example) visual forms can have a clear effect on what is remembered, even when the labels have only an arbitrary relation to the shapes. And well-established research on misinformation and suggestibility shows that linguistic insertions can infect or bias subsequent recall of a visual scene (for a summary see Hardin and Banaji, 1993, pp. 288–292).

With this modification of the more extreme view that language structures the mind, we retain the core anti-expressivist idea that language has a whole range of direct cognitive functions, influencing what's available for explicit memory, or packaging and chunking information to aid encoding. On such modified views, language need not *determine* thinking, but may for example afford various cognitive tendencies (Lucy, 1999). But with this kind of modification, we are shifting from lingualist towards anti-lingualist varieties of anti-expressivism. And indeed this is precisely what Andy Clark suggests in a series of commentaries on anti-expressivist views (Clark, 1996, 1997 chapter 10, forthcoming; compare Jackendoff, 1996). Clark's 'supra-communicative' view of language is that public language acts as a computation-transforming instrument, not just expressing pre-existing thoughts but expanding the realm of the thinkable (Clark, 1996, 93–4). This is the view which, I suggest, would be attractive to developmental theorists of autobiographical memory

if they can accept the shift from lingualist to anti-lingualist interpretations of their framework.

5. The supra-communicative view

Motor development relies on adult help offered at particular moments, so that skills such as walking and swimming can later be performed independently. Similarly, certain forms of cognitive development require external aid—from the human and the natural environment—in the course of learning how to think, remember, or solve problems independently. Most children learn similar motor skills, when characterized broadly, but the idiosyncrasies of their particular developmental trajectory leave traces on their habits, expertise, and patterns of action. Likewise, different developmental paths result in similar mature cognitive capacities, but the peculiar form of the interpersonal scaffolding which has been gradually internalized may leave traces in the idiosyncrasies of their subsequent cognitive performance (Thelen and Smith, 1994; Clark 1997, chapter 2; Griffiths and Stotz, 2000). This is an enabling cultural sculpting of the child's mind, which runs alongside (and is intimately tangled with) the productive cultural shaping of their body, skills, and behaviour.

Andy Clark's use of these Vygotskian themes is, as Carruthers notes, "a sort of intermediate-strength version" (2001, Section 2.3), neither so mild as to slip back into expressivism, nor so strong as to make language actually restructure the mind. The idea is significantly weaker than Carruthers', because it deals only with the influence of language on diachronically extended processes of thinking (or remembering) over time: individual tokenings of mental representations still have their contents entirely independent of any linguistic representation (Carruthers, 2001, Section 2.3). In other words, there is a clear distinction between Clark's connectionist-inspired anti-expressivism and the lingualist anti-expressivism of either Carruthers or extreme Whorfians.

Words, for Clark, act as filters, labels, and other tools for thinking. Language is a key cognitive technology, which transforms and reshapes computations. In particular, the rendering of a thought in linguistic form helps to turn the thought into an object, making it more stable, to be considered, reconsidered, and utilized on future occasions (Clark, 1996, 2001a, pp. 143–7). This isn't simply a matter of augmenting memory with external symbol systems; in addition, it allows for self-criticism, and for using thoughts about thought to help us then structure the (physical and social) world in ways which further aid our cognitive processes. As Clark puts it, in making "designer environments", we are (individually and collectively) able to "make the world smart so that we can be dumb in peace" (1997, p. 180; 2001b).

The supra-communicative view of language, then, is part of a more general vision of the 'extended mind': the vehicles of mental representation spread beyond the brain and body into cognitive instruments and symbol systems, and perhaps other people's minds (Clark and Chalmers, 1998). The point is not that symbol systems

outside the mind are *like* our inner capacities, but that quite disparate inner and outer elements can be coopted simultaneously into integrated larger cognitive systems for particular purposes (Clark, 1997, p.220, 2001b). Internal engrams link up in extended networks with what Merlin Donald calls 'exograms' which have quite different properties (1991, 308–319; compare Rowlands 1999, chapter 6), so that these temporary extended systems must be studied by diverse sciences of the interface, which deal with cognition and media at once.

Again, my aim here is not to defend this perspective against objections, but rather to point out that it is a genuine alternative to both expressivism and lingualism. This is why it is an attractive package for thinking about the developmental psychology of autobiographical memory.

6. Social interactionism and autobiographical memory development

The relative roles of language and culture, temporal representation, theory of mind and metarepresentational capacities, and self-schemata in the development of autobiographical memory are not at all clear. On the 'social-interactionist' view, parental and cultural models or strategies for the recounting of past events act as initial scaffolding on which children start to hang their own memories. They then internalize the forms and narrative conventions appropriate to their context (Fivush, 1991; Nelson, 1993; Nelson and Fivush, 2000).

The point here is not that children cannot remember in solitude; nor that they remember only what they talk about; nor that all their personal memories must take some narrative form (rather than, for instance, being isolated sensory memories). Rather, the point is that both shared and inner reminiscing alters the form and the content of subsequent AMs. Through shared talk about the past, children learn both the appropriate forms for recollective reports, and the social functions of such talk. Variations in narrative practices may then reappear in the subjective idiosyncrasies of early remembering as children begin both to develop a life history and to be able to tell others what they are like.

Cultural variations in the nature and contexts of talk about the past, and intracultural variation in the motivations for and the richness of specific kinds of remembered narratives, have been investigated in some detail within this tradition. In general, the children of parents who engage in more 'elaborative' and less repetitive or pragmatic conversation about the past will themselves spontaneously produce richer narratives. In America at least, mothers and fathers on average talk more elaboratively about the past, and with more emotional content, with girls than with boys (Reese, Haden, and Fivush, 1993; Fivush, 1994). This may be related to the fact that, on average, women across cultures report earlier and richer memories from childhood than do men (MacDonald, Uesiliana, and Hayne, 2000). Cultural style too affects memory over time too. Caucasian American mothers and children talk more about the role of the self in past episodes than do Korean dyads, and the Americans also include a higher proportion of references to their own and others' emotional states in narrating the past (Mullen and Yi, 1995).

Many intricate issues arise in interpreting this flourishing social-interactionist research tradition.[11] In particular, the extent to which these individual and cultural variations have any longer-term influences on later AM is not clear. I will raise my simpler concern after briefly mentioning some alternative perspectives. Some who offer rich definitions of genuine AM argue that the full-blown capacity does not emerge until around the age of 4: this is when the child's theory of mind develops sufficient sophistication to understand that some forms of knowledge derive causally from specific past episodes which have been personally experienced (Perner and Ruffman, 1995, Perner, 2000). This account may yet be compatible with a social-interactionist picture of the earlier, component stages of AM development.

A more direct competitor to social-interactionism is the 'self-recognition' approach (Howe and Courage, 1997). On this view, the personalization of event memory requires the emergence of the 'cognitive self' usually late in the 2nd year. The emergence of AM is "controlled by the discovery of the cognitive self", which can then organize information by reference to goals; and the development of AM is then controlled by "increases in the ability to maintain information in memory storage". Infantile amnesia is due not to any memory deficit but to the lack of a personal frame of reference. For Howe and Courage, language thus plays only an ancillary, expressive role in communicating memories. The individual differences in early AM which the social-interactionists study are likely, they argue, to be "related to maturational, not social or experiential, factors" (1997, p. 515). Although the self-recognition approach faces some direct challenges, my interest here is in its relation to the social-interactionist framework.[12] Conway and Pleydell-Pearce (2000, p. 279) suggest that their related model, which relies on the development of a 'self-memory system' to drive early AM, is not incompatible with moderate versions of social-interactionism. But the social-interactionist framework does face one significant objection.

There may be a variety of strong interactions between individual and shared reminiscence, as the social-interactionists argue. But this does not mean that the child's developing internal representations are a *straightforward* projection or internalization of the shared narratives. Fivush and her colleagues occasionally write as if the format of autobiographical memory is itself linguistic or language-like, as if children simply incorporate the forms and contents of local external narratives. Following Vygotsky, Fivush argues that "the narrative forms that children are learning to organize their recounting of past experiences are also used for organizing their internal representations of past experiences" (1994, p. 138). This is possible, but the argument slides too quickly towards a lingualist conception of mental representation. One might compare the way in which the sociologist of collective

[11] Bloom and Keil (2001) offer a sceptical methodological and theoretical analysis of a range of claims about the effects of language on thought. But they see this social-interactionist work on AM development as one area in which both language-general and language-specific effects of narrative on the format of memory may be successfully demonstrated (p. 361, p. 364).

[12] One such challenge focuses on the self-recognition mirror test for the development of a self-schema. The 'self-recognition' theorists rely on this being a genuine test for knowledge of self, rather than for knowledge of mirrors. Howe and Courage (1997) include a helpful discussion of cross-cultural evidence.

memory Maurice Halbwachs slips from the claim that memories are not preserved "in some nook of my mind to which I alone have access, for they are recalled to me externally" to the different, more lingualist claim that "one cannot think about the events of one's past without discoursing about them" (1925/1992, p.38, p.53; Sutton, 2002, Section 4). There are legitimate intermediate positions. We can accept that what Peggy Miller calls the "distribution of storytelling rights" in a culture or in a family may strongly influence the uses and the contents of individual memories (Miller et al. 1990), without having to assume that either the format or the organization of those individual memories is literally linguistic or narrative.

The problem here is partly methodological, in that there are no clear nonverbal measures of AM. It is in general very hard to find non-linguistic ways of thinking about personal narratives. Thus there is always a danger, in the social-interactionist tradition, of mistaking what are primarily early linguistic proficiency or narrative skills for more specific mnemonic abilities. As Howe and Courage complain, "the expression need not be isomorphic with the memory representation" (1997, p. 505). The social interactionists address the problem by seeking to correct for the total amount of talk, so that a case can be made that memory is independent of linguistic skill. Harley and Reese (1999) also suggest that event sequencing tasks (action sequences, such as those involved in acting out a picnic or a train ride) are a nonverbal analogue of narrative structure in AM.

But there is also a richer, more theoretically grounded, way of averting such criticism. This would require an explicit commitment to some anti-lingualist vision of mental representation, such as that offered by Clark. To the extent that the social interactionists have been aware of anti-lingualist options (such as connectionist accounts of mental representation), they have perhaps seen them as too expressivist, and as requiring an individualist vision of the vehicles of representation as solely in the head. The supra-communicative view, though, demonstrates that anti-lingualists can also be anti-expressivists. It remains, then, to suggest just how this combination of views might be fruitful in understanding the development of AM.

7. Towards a developmental systems view: Internalization and self-regulation

Harley and Reese (1999) make the further claim that their evidence shows the existence of different pathways to early AM. Children who are early self-recognizers (according to the self-recognition tests described by Howe and Courage, 1997) may find their way to AM in a fashion that is rather more independent of the linguistic environment. Late self-recognizers, in contrast, may need to use linguistic and narrative scaffolding to achieve similar outcomes in the AM system. Self-recognition and parental reminiscence style, then, may predict different aspects of talk about the past (Harley and Reese, 1999, p. 1345).

Whatever the merits of this particular pluralist proposal, the general line of thought is highly suggestive. The notion that typical or regular outcomes result from reciprocal interaction between different elements of an extended developmental system is already enough to challenge Howe and Courage's exclusive focus on

"maturational" over "social or experiential" factors in the development of AM. To put this in the terms suggested by Paul Griffiths' general account of developmental systems theory, any 'inheritance' of cognitive capacities needs to be seen as itself extended (in Clark's sense). The physical, social, and narrative environments are all reliably recurrent under normal conditions (Griffiths, forthcoming; compare Griffiths and Stotz, 2000, Clark, 2001b). The idiosyncratic features of individual AM are constructed in each generation, through a complex interaction of a wide range of internal and external parameters. AM is already "cultural" in the toddler years (Nelson and Fivush, 2000, p. 292). Reference to "innate" or "maturational" processes in the study of cognitive development is thus little more than a promissory note for the future progress of sciences of the interface.

The primary theoretical task for the social interactionists, then, in addition to pursuing integrated pluralist models of the development of AM (compare Welch-Ross, 1995), is in trying to clarify just what AM *is*. What could it mean to say that AM is in some sense influenced or even structured by the local narrative environment, if this is not to mean that representation in AM is itself linguistic in form? How exactly do particular genre-related cultural norms and narratives sculpt AM, if those norms and narratives are not simply downloaded into the mind? What kind of constrained free play, or regulated improvisation, is there in the relation between narrative tradition and the process of learning to remember?

In a line of thought entirely compatible with Clark's supra-communicative view, Ruth Millikan sees "the stabilizing hand of language" as its key cognitive role, enabling us both to learn complex concepts, and to reidentify the objects of those concepts "in the flesh" (2001, pp. 164–5). Talk about the past, in particular, whether interpersonal or in the form of private inner speech, is one example of this process as turned inwards. The repeated recovery of episodes of the personal past in certain kinds of intentional retrieval, for example, may turn out to depend strongly on the role of language in AM. For Clark, by using words to think with, we artificially create an approximation of stable, context-independent, abstract representations for later inspection, manipulation, and shared attention. Here the mental item which is stabilized is a perspective on the personal past. It may be by utilizing local narrative resources to "freeze" thoughts about the past in this way (compare Clark, 1997, p. 210) that children develop the perspective-switching abilities which allow them to understand that others have different perspectives on the same once-occupied time.

The verbalizing of thoughts about the past may change their content:[13] and the particular ways in which this occurs in childhood involve the internalization of locally-available cognitive props or pivots with which we slowly master and civilize our own brains (compare Dennett, 2000). We simply don't yet know enough about the developmental and personality psychology of memory to have any clear idea of the long-term effects on AM of individual cognitive trajectories in development. The particular cultural, parental, and institutional learning aids which scaffold the development of AM are, in a way, deeply contingent. Self-regulation within a culture

[13] "What may have been inchoate becomes sequential. What was fleeting takes on substance" (Engel, 1999, p. 11).

involves the active construction of personal life stories in processes which combine reproduction and tradition with variation and inconsistency (compare Strauss and Quinn, 1997, chapter 3).

There are a number of integrative options for taking these interdisciplinary speculations further. Recent neuroimaging studies of episodic memory might offer one way of testing specific developmental hypotheses about the causal paths of AM acquisition. Cognitive ethological studies of temporal representation in creatures without self-schemata can investigate what memory systems might nonetheless be in common. Cognitive neuropsychological and neuropsychiatric case studies might reveal some patterns of breakdown in the relation between individual brains and the narrative environment. Even if neurobiologists and narrative theorists are not studying the same phenomena, the idea of constructing a positive framework in which their different investigations into memory might be located may one day look a little less hopeless.

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