

## A PRELIMINARY CASE FOR AMNESIC SELVES: TOWARD A CLINICAL MORAL PSYCHOLOGY

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Does episodic memory make us who we are? Scholars from Aristotle to the present claim that episodic memory is necessary for one to be a self, a person, or an agent. A consequence of the episodic necessity hypothesis (N) is that individuals with episodic amnesia fail to qualify as selves, persons, or agents. This ethical demotion requires empirical justification. I show that established dissociations in individuals with episodic amnesia falsify many initially plausible formulations of N. The task going forward is to formulate a hypothesis that avoids falsification or to conclude that no plausible formulation succeeds. This method of clinical moral psychology affords incremental progress in the difficult task of showing how selves, persons, and agents are implemented in cognitive mechanisms.

### 1. THE EPISODIC NECESSITY HYPOTHESIS

The hypothesis that memories of personal experiences are necessary for the existence or maintenance of the self has been repeated time and again in literature, science, philosophy, and the arts. John Locke (1689) held that memories for past experiences, thoughts, and actions constitute the identity of the self or person over time:

Personal identity—that is, the sameness of a rational being—consists in consciousness alone, and as far as this consciousness can extend backwards to any past action or thought, so far reaches the identity of that person. So that, whatever hath the consciousness of present and past action is the same person to whom they belong. (Locke, 1689 Bk. II, Ch. 27, Sec. 9)

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Larry Squire and Eric Kandel (1999), criticizing Descartes' *cogito*, also claim that episodic memory is necessary for us to form connections with ourselves:

We are not who we are simply because we think. We are who we are because we can remember what we have thought about.... Memory is the glue that binds our mental life, the scaffolding that holds our personal history and that makes it possible to grow and change throughout life. When memory is lost, as in Alzheimer's disease, we lose the ability to recreate our past, and as a result, we lose our connection with ourselves and with others. (p. ix)

They continue:

Life without the capability to store information, or to recall previously stored experiences, is a life in dissolution, a life without mental past, present, or future, a life without ties to other people or events and, most tragically, without ties to oneself. (Squire & Kandel, 1999, p. 201)

For others, episodic memory makes a necessary contribution to our status as agents. Thus Samuel Johnson (1837/1750): "It is indeed the faculty of remembrance which may be said to place humans in the class of moral agents" (p. 75). Nietzsche (1887) proposes that the shackles of civilization and culture, the basis of morality, were formed through the use of brutal mnemonic devices, such as burning oil and the rack. Still others, such as Oliver Sacks (in his landmark 1970 discussion of JG, the "lost mariner") and Luis Buñuel (1984) believe that memory is required for our very existence as persons: "Memory is what makes our lives....Our memory is our coherence, our reason, our feeling, even our action. Without it we are nothing" (Buñuel, 1984).

Each of these authors expresses a different version of the episodic necessity hypothesis (N): that episodic memory is necessary for one to be, have, or maintain a self in some significant sense.

One consequence of N is that individuals with episodic amnesia, those who have lost or failed to develop the ability to remember their past actions and experiences, cease to be selves in some significant sense. For Locke, an individual with episodic amnesia, who does not form conscious connections with her past experiences, does not persist beyond the reach of her immediate experience. Oliver Sacks (1970), describes JG as a "lost mariner," adrift on a sea of time, his life arguably reduced by Korsakoff's syndrome to, "a sort of Humean froth, a meaningless fluttering on the surface." Endel Tulving (1983) claims that: "If we retained all our other mental capacities, but lost the awareness of time in which our lives are played out, we might still be uniquely different from all other animals but we would no longer be human as we understand it" (p. 311). These claims can be taken as a matter of common sense. Many of us (author included) are terrified to realize that our memories for past events are slowly fading away and to consider the possibility that we might some day, through aging, brain damage, or disease, cease to remember our pasts at all. A consequence of this deeply intuitive connection is that we (author included) are fascinated and moved by fellow humans, known by initials such as B, DB, HM, JG, Jon, and KC, who now lack the ability to record or recall the experiences of their lives.

There are ethical implications of saying that a human individual lacks a self, is not a person, or is no longer an agent. Such terms as self, person, and agent are not mere descriptions of states, such as having a mass or reacting at a given rate; they are statuses granted to special sorts of individual.<sup>1</sup> To claim that an individual has lost these statuses is to imply (knowingly or not) that he or she no longer deserves the rights appropriate to selves, persons, and agents proper, and that they can no longer undertake the commitments, obligations, and duties that selves, persons, and agents proper can undertake. If HM today is no longer the same as HM yesterday, for example, then arguably HM today is only improperly praised or blamed by his predecessor's actions, a promise made to HM yesterday is not a promise made to HM tomorrow, and HM today can no more consent to treatment undergone by HM tomorrow than could a different person entirely. If KC is not an agent, then he is not the kind of individual that deserves blame or praise for his actions and, indeed, might not be the sort of individual that acts in any robust sense at all. If JG's life is meaningless or insignificant, then one might reasonably ask whether there is any compelling need for it to continue.

Seen in this light, N in its various forms has both a scientific and an ethical dimension. It is a scientific claim about the causal import of episodic memory to the behaviors and cognitive capacities possessed by individuals that have it (relative to individuals that do not).<sup>2</sup> It is also an ethical claim about the status of those individuals. The ethical claim that individuals without episodic memory do not have the full status of a self, a person, or an agent depends in part on empirical assumptions about what episodic memory contributes to human life that cannot be supplied by other cognitive faculties in its absence. A full assessment of N thus requires both philosophical and scientific work. Philosophical work is required to define more or less clearly and precisely the central capacities an individual must exhibit in order to deserve the status of a self, a person, or an agent. Scientific work is required to assess whether people with episodic memory deficits (and other deficits) can meet those standards. Full consideration of either of these dimensions is beyond the scope of this short précis.<sup>3</sup>

The purpose of this essay is to illustrate a path to progress in learning how episodic memory contributes to the self in all these senses. The progress unfolds by making conjectures about how episodic memory contributes to such statuses and trying to prove them wrong (Popper, 1934). Such failures then point the way to sharper formulations of the hypothesis that episodic memory makes a significant contribution to one or more capacities that we take to be causally or constitutively relevant to being a self, person, or agent in the intended sense. Most of the arguments below rely on showing that there are individuals with episodic amnesia who nonetheless maintain competence in the targeted capacity mentioned in a

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1. On states and statuses, see Brandom (1994, pp. 15–18).

2. The sense of necessary under discussion is a kind of causal necessity. Without episodic memory, one could not have a capacity required for one to be a self. Such claims presume a fixed causal background. Perhaps the backgrounds can be changed with social and technological adjustments to allow amnesic individuals to find new ways to solve old problems (see Anderson 2008; Sharon, Moscovitch, & Gilboa, 2011; Tulving, 2002). I intend N to include relationships weaker than causal necessity as well, however, such as the claim that episodic memory makes a significant, *de facto* contribution to our status as selves, persons, or agents.

3. For a previous defense of amnesic selves, partly in response to Sacks' discussion of JG, see Evers (1999).

particular formulation of N. If such dissociations exist, then the formulation of N is false. Call the method *clinical moral psychology*.

## 2. EPISODIC MEMORY

The distinction between episodic and semantic memory traces at least to Aristotle's discussion in *De Memoria* (Annas, 1986; compare Sorabji, 1972) but gained prominence in contemporary psychology largely through the work of Endel Tulving (1983, 1985).<sup>4</sup> Tulving defines episodic memories as memories of personal experiences of events accompanied by awareness that one previously experienced the event (Tulving, 1985). One might, for example, have a memory of drinking with Koriskos. Memories of this form are canonically expressed in the form, I remember  $\Phi$ -ing, where  $\Phi$ -ing is always something that happened in the past. Such memories often include information about what, when, and where an event happened (Tulving, 1983) but, in addition, they typically involve a kind of experientially and contextually rich re-experiencing of the event. They are typically organized spatially into scenes and/or temporally into event or narrative structures.

Semantic memories, in contrast, are memories for general knowledge. They contain context-free information about facts and events as well as an understanding of words and concepts. Semantic memory can also include general facts about one's self, such as one's address, where and when one was born, and the number and names of one's siblings. Semantic memories tend to be organized in terms of conceptual (rather than spatial and temporal) relations. They are canonically expressed in the form, I remember that P, where P can take any tense. One might remember that Koriskos was a Socratic philosopher, that he is now in the next room, and that tomorrow he is again coming for drinks. One can remember many facts about Koriskos without ever experiencing Koriskos.

There is some controversy over how many memory systems there are and how precisely they are related to one another (see Eichenbaum & Cohen, 2001; Rosenbaum, Murphy, & Rich, 2011; Schacter & Tulving, 1994; Schacter, Wagner, & Buckner, 2000; Squire, 2004). Most taxonomies recognize roughly a distinction between implicit, or procedural, forms of memory (such as the formation of habits and the learning of skills) and explicit, or declarative, forms of memory (memories for events and facts). Classical conditioning, operant conditioning, perceptual priming, and the acquisition of various motor skills and habits are among the implicit forms. Episodic and semantic memory are explicit kinds of memory.

The distinction between episodic and semantic memory need not be entirely sharp for present purposes. Nor is it required that the two forms of memory appear separately in typical human memory experiences. Nor is it required that the two forms of memory have different neural subsystems, nor that they are localized in any particular brain region. What matters for present purposes is only that episodic memory can be manipulated independently of semantic memory and, in particular, that one can lose one's ability to store and/or retrieve episodic memories while retaining much of one's semantic memory and other cognitive capacities besides. This is now a matter of empirical record (Gilboa et al., 2006; Klein, Loftus,

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4. For taxonomies of memory systems, see Eichenbaum and Cohen (2001; Rosenbaum, Murphy, & Rich, 2011; Schacter & Tulving, 1994; Schacter, Wagner, & Buckner, 2000; Squire, 2004).

& Kilstrom, 2002; Rosenbaum et al., 2005; Tulving, 1985, 2002; Vargha-Kadhem, Gadian, & Mishkin, 2001).<sup>5</sup> The question is whether individuals with episodic amnesia have the capacities required to have and maintain their self, personhood, or agency, or to otherwise live the meaningful lives distinctive of persons.

### 3. THE SELF: AN ABRIDGED FIELD GUIDE

All formulations of N considered below take roughly the form: Episodic memory is necessary for capacity or trait  $\psi$ , which constitutes or is necessary for one to have a self in sense S.<sup>6</sup> They differ from one another in filling  $\psi$  with different capacities or traits and S with different senses of the self. Three common senses of self are especially relevant to the following discussion.<sup>7</sup>

#### SELF AS UNITY

The term self is often used to refer to the subject of unified awareness, either at a given time or across different times. In the synchronic case, the self is the thing that is simultaneously aware of diverse conscious feelings, perceptions, and thoughts. The synchronic self appears as the sensorium commune in ventricular theories of the brain and is singled out for elimination in Hume's empiricist psychology (1739–40). The idea has a vestige in the 40Hz cortical oscillations thought by some to bind different kinds of information from different areas of cortex into a unified conscious field (Tononi, 2008). In the diachronic case, the self is that thing that persists from one moment to the next and that constitutes the identity of a single self or person

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5. Roediger, Rajaram, and Srinivas (1990) argue that the evidence used to establish a dissociation between episodic and semantic memory is confounded by the failure to find and use tasks that display the dissociation without potential confounds in terms of, for example, the difficulty of the task or the working memory demands of the task (see also Kelley & Jacoby, 1990). These failures of dissociation are more relevant to the question of whether there are separate memory systems for episodic and semantic memories than to whether there are people who, under ecologically relevant conditions, fail (as a matter of fact) to generate memories of personal experiences while they maintain the ability to report semantic knowledge. At any rate, the present discussion is premised upon an apparent dissociation that, like all empirical findings, might turn out to be merely apparent. A full discussion of these crucial matters is beyond the scope of this essay.

6. One might also introduce a variable for episodic memory to allow for different conceptions of this psychological capacity and to allow for the many ways that an episodic memory system might perform sub-optimally in this capacity.

7. Farah (2007) and Ramachandran (1999) argue that there are no selves (persons, agents) on the grounds that such ideas are constructs of the brain. I believe such arguments commit the genetic fallacy. Others (such as Doris, 2009) are skeptical about persons because the dominant philosophical conceptions of personhood are psychologically unrealistic. The project in this paper presumes (contra Farah and Ramachandran) that the self, person, and agent (however inchoate) are more or less proper objects of scientific investigation. The project is consistent, however, with Doris' revisionism. It is common in mechanistic sciences that the phenomena that call out for our investigation are subtly and sometimes radically transformed as the facts come in. I do not presume any particular conception of the self, person, or agent. Any well-articulated analysis of these concepts will be useful for these purposes if it places empirical constraints on the kind of creatures that can live up to such a designation.

over time. Locke, for example, held that episodic memories link conscious states into a temporally extended whole. This view is discussed in Section 4.

## SELF AS REPRESENTATION

In scientific psychology, the term *self* is most commonly used to refer to one's self-concept, one's self-knowledge, or one's autobiographical narrative. The self is a representation. As Neisser (1988) and Klein and Gangi (2010) emphasize, there are many kinds of self-representation, operationalized with different kinds of task. Properly intentional forms of self-knowledge might include: knowledge that one exists, ability to refer to one's self with a first person pronoun or a proper name, and the capacity to identify one's self in mirrors and pictures. Self-knowledge might include knowledge of one's character traits and core values. In other contexts, the self is described as the narrator (Velleman, 2005) or the protagonist (Dennett, 1992) in a story spun by the brain.

One can believe in the self as a distinctive kind of self-knowledge without believing in selves as synchronic or diachronic unities. Some scientists seem to hold that because our sense of self is a representation, or projection, of the human mind, it is therefore an illusion (Farah, 2007; Ramachandran, 1999). Others hold that selves as unities come into being precisely through the act of constructing such representations or narratives (Dennett, 1992; Velleman, 2005). Despite their differences, thinkers of both temperaments might focus on the same form of N: episodic memory is necessary for one to  $\psi$ , and  $\psi$  is required for one to form a self-concept of the appropriate sort.  $\psi$  can then be filled with capacities such as the capacity to retain knowledge of one's history, to acquire knowledge of one's traits, or perhaps to construct an ongoing life narrative. This family of views is discussed in section 5.

## SELF AS AGENT

Finally, the self is commonly described as a locus of decision-making and, therefore, the seat of moral responsibility. The self is the executive that makes decisions and the agent that carries out the directives. When we assign praise and blame for an action, we look for the person who did it.<sup>8</sup> One might be able to integrate information from different sensory modalities and remember one's past but nonetheless fail as an agent in one sense or another. One might fail because one cannot properly reason about how one ought to act, or because one is incapable of retrieving salient information about the choices, or because one cannot consider the consequences of one's actions, or because one cannot properly assess the value of rewards and punishments in the present or the future, or because one cannot maintain action plans over time. Each of these capacities can be entered into N to yield a different hypothesis about how episodic memory contributes to moral

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8. Where Locke and his followers emphasize the metaphysical unity of consciousness, those who think of the self as an agent sometimes think of it as a practical unity of thought and action, in short, as the solution of a coordination problem (see Korsgaard, 1989).

agency: episodic memory is necessary for one to  $\psi$ , which is necessary for one to be a moral or prudential agent. This family of views is discussed in Section 6.

As Eric Olson (1998) notes, it is unlikely that a single thing, the Self, plays all these roles. Should we discover that one and the same thing could, indeed, play them all, that would be a grand scientific and philosophical achievement. It is far more likely, based on how things tend to develop in cognitive neuroscience, that different complexes of cognitive mechanisms contribute to these different senses of self. I therefore accept each of these as a potentially useful phenomenon for which cognitive mechanisms might be sought (Craver, 2007).

#### 4. EPISODIC MEMORY AND THE SELF AS UNITY

No philosopher or scientist to my knowledge holds that episodic memory is necessary for the synchronic unity of the self. Individuals with episodic amnesia are very difficult to distinguish from healthy people in the moment. They recognize objects and follow instructions. They hold conversations. They understand jokes. They play card games and watch baseball on TV. They combine visual information with auditory information and perform at or above average on a wide range of psychological tasks. There is no empirical reason to doubt that there is something it is like to be an individual with amnesia (Nagel, 1974). Likewise, there is no reason to doubt that individuals with amnesia could be pearl selves, relatively short-lived units of integrated experience (Strawson, 1997).

Problems arise, one might think, when it comes to linking these pearls together into a piece of personal jewelry. Locke defends a strong form of N with respect to the diachronic unity of the self: episodic memory is necessary to connect conscious experiences at different times, which connections are necessary for the diachronic unity of the self. Locke defines a person as a thing that has reason and reflection and that can conceive of itself as itself at different times and places. The identity of the person over time, on the simplest and strongest formulation of his view, is constituted by episodic memories that allow consciousness to reach back to earlier times and different places. Suppose I remember drinking with Koriskos. According to this view, I am now the same person who drank with Koriskos because I remember drinking with Koriskos.

If so, individuals with episodic amnesia lack the connections that constitute their personal identity over time. Oliver Sacks wonders whether JG's life has any coherence or whether it is, instead, a Humean froth, a mere fluttering on the surface with nothing to bind it together. Gustav Störing describes Mr. B, who was overwhelmed by coal gas and lost the ability to hold memories for longer than two seconds, as a "man of the absolute present" (Grüntal & Störing, 1930; Störing, 1936). One might reasonably wonder, as Störing does, how such a man could be the same person from one two-second interval to the next. KC, who lost all of his episodic memories as well as his capacity to form new ones in a motorcycle crash, can perform complicated tasks until his attention shifts, at which point he loses all ability to recall even recent experiences. Perhaps with each shift of attention, one person dies in KC, and another is born. Can science help to decide the matter? Yes. But only after some philosophical stage setting.

Bishop Joseph Butler (1736) pointed out that the Lockean analysis of personal identity is viciously circular (see Slors, 2001).<sup>9</sup> Apparent memories of past experiences can be either veridical (true) or nonveridical (false). The simple Lockean view of diachronic identity is predicated on veridical memories. For Locke, a person remembers some past experience if and only if:

- (a) the person has an apparent memory of an experience,
- (b) the content of the apparent memory is identical (or very similar) to the past experience, and
- (c) the person in fact had that experience.

It follows from condition c that an apparent episodic memory is in fact an episodic memory only if the person remembering also had the experience. If I have never gone drinking with Koriskos, I cannot remember drinking with Koriskos, no matter how vividly I imagine myself to have done so. The problem for this Lockean view is that if I must be the same person who drank with Koriskos in order to truly remember drinking with him, then episodic memory presupposes, and so cannot analyze, my being the same person now that I was then. I remember drinking with Koriskos because I drank with him, not the other way around.

A familiar Lockean response to this problem is to define a form of episodic memory, quasi-memory, without condition (c). A person quasi-remembers an experience if and only if:

- (a) the person has an apparent memory of an experience,
- (b) the content of that apparent memory is identical (or very similar) to the past experience, and
- (c\*) the memory is causally dependent, in the right kind of way, on the past experience that is qualitatively identical or similar.

The idea is to substitute the causal requirement in (c\*) for the identity requirement in (c) (see Penelhum, 1970; Shoemaker, 1970). One can then analyze personal identity in terms of quasi-memories without circularity (see Slors, 2001). Quasi-memories connect experiences at different times. If many such connections hold between experiences at different times, the view holds, they constitute a continuous person, or at least something that matters just as much (see Parfit, 1984; Shoemaker, 1984).<sup>10</sup>

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9. This Lockean view of personal identity has been attacked on many grounds. In its simplest formulations, it has difficulty accommodating identity for people who are anaesthetized or asleep. It also has difficulty with failures of transitivity involving forgetfulness and senility. I presume the account can be modified to avoid these concerns (see Perry, 1975).

10. Some philosophers, such as Schectman (1990), question whether q-memories are really possible. Recent evidence shows that they are actual. Klein and Nichols (forthcoming) discuss RB, who can describe vivid scenes of past experiences that he in fact had but does not feel the experiences are his. The sense of ownership for one's episodic memories can be damaged independently of one's ability to have episodic memories. Others push the circularity question one step further and insist that defining the right kind of causal connection in condition (c) ultimately requires one to smuggle in the concept of identity (cf. Zemach, 1983). If q-memories cannot underlie personal identity, this version of N is not viable. I show that if they succeed as such, they succeed in a way that undercuts the uniqueness of episodic memory as the requisite form of psychological connection.

Suppose for now that q-memories can in fact constitute the continuity of the person or self over time. The important point is that if q-memories are the sort of thing that can constitute the continuity of the person over time, then episodic memory no longer plays a necessary role in the linkages constitutive of diachronic identity (Shoemaker, 1984). What matters in a q-memory is merely a causal relationship between conscious states.<sup>11</sup> But individuals with and without amnesia maintain many causal relationships among conscious states independently of episodic memory.

Episodic memory is one of many kinds of memory. KC retains semantic knowledge from before his motorcycle accident despite being unable to recall a single episode from his life. Some individuals with episodic amnesia, such as Jon and HC, have graduated high school and have completed some post-high school education (Gadian et al., 2000; Kwan Carson, Addis, & Rosebaum, 2010; Rosenbaum, Carson et al., 2011; Vargha-Khadem et al., 1997). HM, like other individuals with amnesia, was in fact capable of learning some kinds of information under appropriate circumstances (Corkin, 2002). He could acquire and retain skills and habits, getting better and better at new tasks over time. He could be conditioned. He could remember the layout of a home he moved into after his brain surgery. He had echoic and iconic memories and more or less normal working memory capacity. An individual that lacked all the commonly recognized forms of learning and memory might no longer deserve the title "creature" let alone the titles "self," "person," or "agent." But even on the assumption that memory is required to link experiences at different times into a person, episodic memory is one of many kinds of memorial binding.

Emotions and moods also link conscious states at different times. One might remain angry about an insult even after one has forgotten it. One might be motivated by a fear that has lost its object in explicit memory. Störriing provides a vivid illustration. At one point during his investigations of B, Störriing returned with B to a hospital room in which B had received a highly invasive and aversive procedure to assess the shape of his cerebral ventricles. As soon as he re-entered the room, B became agitated and broke away from Störriing. He opened the door, ran down the hall, and descended a flight of stairs. He even ran out of the hospital before Störriing could retrieve him. This fleeing action lasted longer than the two seconds of conscious awareness at B's disposal, but the independent movements (opening the door, turning down the hall, leaving the building) were bound into a meaningful act by an emotional undercurrent carrying B from one moment to the next.

HM, KC, Jon, and B alike are capable deciding to act and then acting (within narrow time windows). They have body schemes that remember, if only briefly, where they have been and where they are going. One's very model of the perceptual world and one's motions through it might alone provide sufficient intertemporal connections to constitute the continuity of a person over time within the neo-Lockean framework (Slors, 2001). For example, Störriing (1936) describes how B could be driven through complicated acts by cues in the world around him. A flat piece of paper on the floor prompts him to pick it up and place it on the table;

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11. See Martin and Deutscher (1966) for a discussion of the role of causation in an analysis of remembering.

a crumpled piece of paper on the floor prompts him to pick it up and put it in the trash. In each case, the world is a common cause that bridges experiences at different times, linking them into a unified and purposive structure.<sup>12</sup>

Perhaps surprisingly, individuals with episodic amnesia often show considerable constancy of character. KC, for example, prefers the *Price is Right* and *M\*A\*S\*H* to other television shows, Black Label to other beers, and the Toronto Maple Leafs to other hockey teams. He is courteous and quiet, but lethargic and forgetful. He has a sense of humor and a pleasant smile. He is a bit flat, but this facilitates a subtle charm. KC has a personality. The persistence of this personality requires or is constituted by a rich set of causal connections between earlier and later mental states. Such connections contribute no less than episodic memory to his continuity over time in the neo-Lockean view.

The main point is this: The simple Lockean formulation of N holds that episodic memory is necessary to connect conscious experiences at different times, which connections constitute the diachronic identity of the self. This hypothesis has evolved in response to the threat of circularity such that episodic memory no longer plays a necessary role in the identity of persons over time. If episodic memory's contribution to diachronic identity is as thin as the contribution made by q-memories, it is a contribution that, as a matter of empirical fact, many other cognitive and bodily systems make as well. The most viable surviving relative of the Lockean formulation of N thus fails to support the view that individuals with episodic amnesia lack identities over time.

## 5. SELF AS REPRESENTATION: SELF-KNOWLEDGE AND NARRATIVITY

The Lockean idea that episodic memory constitutes the identity of a person over time is most plausible if one thinks of episodic memory as a kind of *mental time travel* (Suddendorf & Corbalis, 2007; Tulving, 1985). Though this manner of speaking is common in scientific psychology, no psychologist believes that episodic memory is in fact a means of transporting one's self to different times. Nor is memory akin to a perceptual window on the past. It is instead a constructive system that assembles representations of the past.<sup>13</sup> Amnesia or no, now is the only time any of us have.

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12. McDowell (1998) argues that the fundamental mistake in the Lockean picture is to presume that the causal basis of the self over time must be identifiable within the contents of consciousness itself—that it must be found in relationships among experiences. In the standard case, at least, minds are associated with bodies, and those bodies tend to move through the world as wholes. Much of the coherence and unity in our perception over time is explained by the fact that there is a single living creature, localized more or less precisely in the world, to which they all occur. Mr. B inhabits a single body and, in virtue of that, inherits a kind of mental unity through the practical need for coordination among different parts of his body and different time-slices of his existence. There are, no doubt, kinds of disunity in the experience of amnesic individuals relative to nonamnesic individuals, but all of us are susceptible to forms of disunity: when our memories fail us, when we sleep, and when we distort and confabulate our pasts. Perhaps we are unified through time not so much by conscious reflection but by the practical need to coordinate the things happening to a single body. Personal unity, such as it is, might be the solution of a coordination problem (cf. Dennett, 1992; Korsgaard, 1989) rather than something modeled after the unity of a material object (as defenders of the soul might have it). If so, there are many ways of solving such a coordination problem, with and without episodic memory.

13. Some psychologists hold that primary deficit in episodic amnesia, in fact, is an impairment in constructing scenes from snapshots (Hasabis & Maquire, 2009) or, alternatively, representing and binding event details (Rosenbaum, Gilboa, Levine, Winocur, & Moscovitch, 2009).

Maybe, though, the ability to recall past experiences is required for one to form or maintain an accurate representation of the self. There are many varieties of self-representation or self-knowledge (Klein & Gangi, 2010; Metzinger, 2003; Neisser, 1988), ranging from the most basic self-recognition capacities (of the sort displayed by an immune system perhaps) to the Delphic quest to know thy self. There can be no doubt that individuals with episodic memory deficits retain many of these capacities, leading one to wonder where (if anywhere) in this field of self-representation people with episodic memory are expected to fail and whether such failures are of particular ethical significance.

Individuals with episodic amnesia are often capable of maintaining more or less fluid conversations for minutes at a time. They ask and answer questions, and they can express opinions about themselves and about the world. They say they love their friends and relatives. They have no reported difficulty making competent use of first-person pronouns, answering questions that require them to assess sentences written in the first person singular, or answering questions about people other than themselves. They know, in short, that the world contains objects and people distinct from themselves.

Similarly, individuals with amnesias can recognize themselves in mirrors and photographs (see, e.g., Corkin, 2002). Sacks relays a memorable example. After JG tells Sacks (incorrectly) that he is in his twenties, Sacks holds a mirror in front of JG's wrinkled face. JG is terrified, at least until Sacks diverts his attention out the window. JG is all too aware that the face in the mirror is his own. His horror evinces the sudden recognition that he has aged. JG, in short, knows that he is JG. There is no reason to suspect that he lacks the conceptual wherewithal to learn that he is spilling the sugar through the aisles of the supermarket (Perry, 1979), or that he has fallen from the carriage (Anscombe, 1957).

Yet there are other, perhaps richer, forms of self-knowledge. We know, with some degree of accuracy, various facts about our lives: our dates and places of birth, our addresses, and the names of our parents and siblings. And we know, with some degree of accuracy, various of our personality traits (Vazire & Carlson, 2010). And at least many of us have the capacity to construct narratives about how our lives and activities are progressing (Dennett, 1992; Schectman, 2007; Velleman, 2005). N might be formulated in terms of each of these: episodic memory is necessary to construct a life history, a sense of one's character, or an ongoing narrative of one's life, which, in turn, constitute or contribute essentially to one's being a reflectively aware person or self.<sup>14</sup> Consider these formulations in turn.

## SEMANTIC KNOWLEDGE OF THE SELF

One might know (semantically) one's name, and know that one is from Ohio, that one is married and has children, and that one worked as an inspector, all without remembering any specific events. Many individuals with episodic amnesia can report facts about their own lives (see Klein & Loftus, 1993). KC knows that he has a brother and a sister, that he lives in Ontario, that he worked in an office, and that he has a good friend. These semantic facts about his life require no explicit recollection of experiences.

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14. One way of delimiting the sense of self under discussion in this version of N is to think of the selves as essentially self-making; that we constitute ourselves as ourselves through an act of story-building, self-representation, or reflection.

Might episodic memory be necessary for one to know what kind of person one is, to know one's traits? People without amnesia are far from ceiling on this task (Vazire & Carlson, 2010); the Delphic quest is, after all, a quest. Yet some individuals with episodic amnesia appear to know themselves well, at least relative to what their family-members and caretakers say about them. KC's self-ratings on a list of character traits, for example, do not differ significantly from his mother's ratings on his behalf. Klein also describes the amnesic individual, DB, as having stable and accurate self-knowledge (compared to his sister's reports) despite being unable to recollect a single episode from his life (Klein, Rozendal, & Cosmides, 2002). Klein, Loftus, and Kihlstrom (1996) describe a third individual, WJ, who maintained accurate self-knowledge for an especially turbulent period of her life (the freshman year of college) throughout a year-long amnesic period during which she could not recall a single episodic memory for the time in question. As Klein and Nichols put it, "resilience of trait self-knowledge may serve as the bedrock for one's sense that one is a continuing, experiencing self even when one's memory based personal narrative has succumbed to the ravages of episodic amnesia" (Klein & Nichols, forthcoming). Perhaps the self constructed in semantic memory is sufficient to provide the kind of self-constituting knowledge prized by those who think of the self as a form of self-representation.

## NARRATIVITY

Still one might conjecture that episodic memory allows individuals to construct personal narratives, and one might conjecture that the ability to construct such narratives is central to being a self, person, or agent in the fullest sense of the word. Dennett describes the self as a fictional center of narrative gravity, a protagonist, in narratives spun by the brain:

[W]e are virtuoso novelists, who find ourselves engaged in all sorts of behavior, more or less unified, but sometimes disunified, and we always put the best 'faces' on it we can. We try to make all our material cohere into a single good story. And that story is our autobiography. The chief fictional character at the center of that autobiography is one's self. And if you still want to know what the self really is, you are making a category mistake. (Dennett, 1992, p. 114)

Velleman (2005) extends Dennett's program by allowing the narrative a causal role in the production of action. The self so conceived is a narrator spinning a yarn that then becomes the basis for future decisions, and so for controlling how the story will unfold in the future. If so, one might wonder whether individuals without episodic memory can construct autobiographical narratives of the requisite sort to achieve such statuses. Young and Saver express the consequences succinctly: "Individuals who have lost the ability to construct narratives, however, have lost their selves" (Young & Saver, 2001, p. 72).<sup>15</sup>

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15. There is disagreement about whether a narrative self-understanding is, indeed, required for one to be a self, form a sense of self, or function properly as a moral agent. Strawson argues that an episodic person (that is, someone who does not organize their lives in terms of narratives) can nonetheless have a rich moral and personal life. It will be different from the life lived by a more narrative person, but it is not less legitimate (see Strawson, 2004, 2007).

Research on the narrative capacities of individuals with episodic amnesia is only beginning to develop. At least some individuals with bilateral hippocampal damage and episodic amnesia appear to have general difficulty imagining future and fictitious scenarios. KC describes his future as he often describes his past: blank. Even when individuals with acquired amnesias are presented with raw materials out of which to construct imaginary scenes and scenarios—visual elements, sounds, and smells—the scenes they construct are disintegrated, particularly lacking in spatial coherence (Hassabis & Maguire, 2009). Consider, for example, how KC imagines a scene involving a first pet:

I guess I'd go out with my dad and buy it. We'd go up to the pet store and get a dog, an Irish setter, and it would be a puppy. We'd bring him home and I don't know what he'd be called. I think I'd call him, I don't know what I'd call him. We'd have to put a stake in the back yard, I guess, to tie him up, get a collar and link it to the clothesline to tie him up. (Rosenbaum et al., 2009)

KC's imaginary story arguably reads more like a list of semantic associations to "dog" than a coherent narrative. These findings about KC have been quantified and replicated in other individuals with amnesia (Hassabis, Kumaran, Vann, & Maguire, 2007; Klein, Loftus, & Kihlstrom, 2002). Some argue that deficits in recollecting the past and constructing imaginary futures might have a root cause in deficits pertaining to the ability "to flexibly recombine stored information in novel ways" (Hassabis & Maguire, 2009). People with episodic amnesias might have difficulty forming coherent narratives.

The required notion of coherence here is admittedly difficult to specify with the precision required for a clear test. KC's story, for example, has a number of spatial details: the dog is in the back yard, and the collar is connected to the clothesline. There is temporal organization as well: the buying, bringing home, and practical realities are arranged in the right sequence. But the details are sparse, and they don't really add up to much of a story. Making matters more complicated, Rosenbaum et al. asked KC both to construct fictional narratives and to recall and recognize details of well-known fairy tales and bible stories. Though KC's performance was significantly worse than the performance of controls, KC demonstrated considerably more constructive ability than one might expect. KC was at times able to create a skeletal outline of the stories, and he could generate sufficient information to convey the gist of the story. But his stories were sparse and fragmented (Rosenbaum et al., 2009), again lacking in overall coherence. The pressing question is: what kind and level of coherence is necessary for one to form a narrative self-representation of the required sort? This is partly a conceptual question to be answered by considering, for example, what sort of narrative a brain would have to spin in order to count as self-constituting (Dennett, 1992; Velleman, 2005) or as the kind of thing that can determine for itself what it would take for its life to go well or poorly.

However this issue is resolved, there is a further question whether the ability to construct future and fictitious scenarios in bible stories and fairy tails is, in fact, the self-narrative capacity required in representational views of the self. There is arguably a difference, that is, between the ability to tell a good story, on the one hand, and the ability to keep a running account of who one is, what one is doing, and why one is doing it (Burge, 2003). To test this hypothesis will require tasks that

assess whether individuals with episodic amnesia can, in fact, make reasonable sense of their actions in the present in terms of a running narrative about what they are doing and why.<sup>16</sup>

The finding that people with acquired amnesia often have deficits in imagining fictional and future scenes contrasts with reports about individuals with developmental amnesias resulting from brain damage at or near birth. Hassabis and Maguire describe one such individual, Jon, as able to construct fictitious and future scenarios despite failing dramatically on tests of autobiographical episodic recall (Maguire, Vargha-Kadem, & Hassabis, 2010). This finding has been confirmed in a study of twenty-one children who suffered bilateral hippocampal damage as a result of oxygen deprivation at or near birth (Cooper, Vargha-Khadem, Gadian, & Maguire, 2011). A possible exception to this trend is the amnesic individual, HC, who was initially reported to have deficits in scene construction. Further testing on a range of tests better-adapted to people with cognitive disabilities, however, reveals that her performance is within the normal range (Hurley, Maguire, & Vargha-Khadem, 2011). Consider HC's response to a request to "Imagine you are standing in front of a large circus tent":

Okay. It's big, like, the big top, so there's like red and white stripes. And then the door of the tent is open, so there's like a little triangle and the flaps are being held open. There is like a million of screaming kids running all over the place with their balloons and they're not looking where they're going and they're running into things and their parents are way far back going, "Be good, Johnny, keep going," like they sometimes do. Um, you can look, you can just see the inside of the flap and you can hear the music really loud. And they haven't even got there yet, but it's really loud. (Hurley et al., 2011, p. 25)

The script continues (and there are others like it), but perhaps this passage suffices to evidence a kind of temporal and spatial narrative construction preserved in a person with very severe (though admittedly incomplete) episodic memory deficits.

It is a truism to suggest that individuals with episodic amnesia differ from other individuals in their experience of the past. They are unable to reconstruct personal episodes. As a result, their self-conception is not populated by memories for personal experiences. But this does not prevent them from forming a sense of who they are, and forming a sense that more or less comports with who other people take them to be. That individuals with episodic amnesias have a different kind of self-knowledge is insufficient to show that individuals with episodic amnesias do not, or cannot, construct an idea of who they are, what they are doing, and how their life is going. Perhaps some individuals with episodic amnesia do lack a coherent personal narrative, and perhaps this is part of what strikes us as tragic about their condition. To make this case, however, one needs to be very clear about just what constitutes narrative understanding and about how such narrative capacities can be assayed without confounds.

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16. KC plays eucré and cribbage with family members and friends. These games require one to play cards strategically and to keep track of key events in the game (such as the playing of a trump card).

## 6. AMNESIA, TIME, AND AGENCY

Finally, consider the self as agent. Perhaps episodic memory is necessary for a capacity that, in turn, is required for us to be agents in the fullest sense of the word. In particular, many people have held that episodic memory contributes essentially to our understanding of the place of our actions in time.

Individuals with episodic amnesia are often described as having deficits in relation to time. JG is a “lost mariner”; B is a “man of the absolute present.” It is worth repeating Tulving’s comment in context:

...we can, if we wish, close our eyes and think about what we did ten minutes ago, or how we celebrated our last birthday. And we can think about what we might be doing tomorrow, or next year. This kind of sense of time makes a huge difference to what we are and how we live. If we retained all our other mental capacities, but lost the awareness of time in which our lives are played out, we might still be uniquely different from all other animals but we would no longer be human as we understand it. (Tulving, 1983, p. 311)

William A. Roberts (2002), in a recent review of the literature on episodic memory in nonhuman organisms, asks

Do animals have a sense of time, episodic memory, and an ability to cognitively project activities into the future? Or are animals permanently similar to KC and to children under the age of 4? Could animals be largely stuck in a permanent present with little ability to remember past episodes or to plan activities for the future....?

Perhaps episodic memory is necessary for a sense of time, which sense is essential for one to be an agent in the fullest sense of the word.

In formulating this hypothesis we should recognize explicitly that there are many ways of thinking about time, the past, and the future. We should expect that one can lose some forms of awareness and knowledge of time and maintain others. To test this formulation of N, one must be precise about the kind of understanding of time that is especially important for being human as we understand it and that is required for us to rise above the level of brutes in this respect.

### EPISODIC MEMORY AND INDEXICAL TIME

The metaphysician, John McTaggart (1908), distinguishes two ways of thinking about time; he calls them the A-series and the B-series. The B-series is a series of events ordered as occurring earlier, later, or simultaneously with one another. Historical time-lines, for example, represent a sequence of events at particular dates arranged spatially so that events to the left of a given target event are earlier, and those to the right are later. The A-series, or indexical time as I will call it, is indexical because it is always indexed to the reference frame of the present. In the A-series, events are distinguished as lying in the future, in the present, or in the past. One might visualize the now as a spotlight moving unidirectionally through

a series of events. Future events become present and then fade into the past as time moves on.<sup>17</sup>

One might reasonably think that knowledge of indexical time is particularly important for one's status as an agent in some full sense of the term. For being an agent requires one not merely to know that one should act at a particular time—say at noon on December 12—which knowledge might be fully represented by creatures having only the conceptual wherewithal of the B-series—but that today is December 12, and that it is now noon. In this respect, knowledge of indexical time is, like other essential indexicals (such as I and here), very close to the core of our being reflectively self-aware. It seems requisite for us to be an agent in any full sense that we recognize that possible futures lie ahead of us, that our pasts are irrevocable, and that the choices we make now will have consequences in the future. If episodic memory is required for one to have knowledge of the A-series, then a person with episodic amnesia could not recognize that what they do now will have irrevocable implications in the future, or that what they do now is constrained by what they have done in the past. That sort of knowledge or appreciation is plausibly required for one to be an agent in the fullest sense.

Christoph Hoerl (1999) argues that episodic memory is necessary for knowledge of the A-series and so for human agency, properly understood.<sup>18</sup> If so, individuals with global episodic amnesia are not agents, properly understood. His argument can be reconstructed as follows:

- (1) To have a concept of the indexical time (A-series), one must understand what it is for an event to be in the past.
- (2) To understand what it is for an event to be in the past, one must understand that the past uniquely constrains the present.
- (3) To know that past events uniquely constrain the present, one must remember specific episodes from one's personal past.
- (4) To remember specific episodes from the past, one must have episodic memories.
- (5) Therefore, to have a concept of indexical time (A-series), one must have episodic memories.

As we will see, the conclusion is false. Premises 3 and 4, I argue, share the blame.

KC had no difficulty answering questions that contain temporal indexicals (tomorrow, in the future, previously, and the like). KC completed the *Zimbardo Temporal Perspective Inventory* (Zimbardo & Boyd, 1999), which assesses attitudes toward the past, the present, and the future. He had no difficulty understanding the questions. He ranks being late for an appointment as a primary example of bad behavior, and he affirms the slogan that meeting tomorrow's deadlines comes before tonight's play. He has no regrets, but he thinks it is important to plan for the future.

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17. McTaggart argued against this way of describing time's flow. I use this language here only to gesture at a familiar idea.

18. Hoerl grounds his discussion of the relationship between memory and time in the case of HM, who lost his memory due to bilateral removal of his hippocampus. HM is an imperfect example for Hoerl's purposes given because HM retained episodic memories for events prior to his surgery. Hoerl extrapolates to imagine a person robbed of all episodic memories and predicts, on the conceptual grounds articulated in the above formulation, that such a person would be unable to understand indexical time.

To further probe KC's conceptual understanding of the A-series, we asked him questions about his concept of the past, the present, and the future.<sup>19</sup> He defines the future as "events that haven't happened yet" and the past as "events that have already happened." He believes that it is possible to change the future, "by doing different things," and that what happened in the past influences what happens in the future. He believes that once an event is past it will always stay in the past, and that it is not possible for someone to undo a murder at some time after the murder has occurred. He can conceive of time travel, describing it as "when you take a body and move it to a previous era," but he does not think that time travel is possible. He denies that events in the future will always be in the future, "because time moves on."

DB gives similar answers (Stan Klein, personal communication). He defines the present as "things happening now," the past as "things happening before... not happening now," and the future as "things that haven't happened yet but someday will." He knows that "if we continue to rely on oil and fossil fuels at the present rate, we will run out in the future." The future, he says, probably cannot change the past or the present, "Unless you had a time machine or something." The past, however, influences the future all the time because "that's the way things work." Like KC, DB grasps the fundamental concepts of indexical time (the A-series).

Both KC and DB know what it is for an event to be in the past, in the present, and in the future. They understand that the past uniquely constrains the present, that (barring time travel) the past cannot be undone, and (extrapolating slightly) that the causal order of things runs from past to future and not in reverse. Hoerl's empirical prediction is false.

Premise 3 is likely to blame. One need not remember specific episodes from one's personal past to know that the past uniquely constrains the future. KC lost all his episodic memories when he was in his twenties; DB was beyond retirement age when he had his heart attack. A lifetime of episodic memories prior to the brain injury arguably could suffice for one to acquire the concepts of indexical time. Such concepts might then be maintained in semantic memory even after the episodic memories from which such concepts were acquired have been erased. Episodic memory would, according to an amended hypothesis, be required for the acquisition rather than possession of indexical temporal concepts. This revised hypothesis could fruitfully be tested in individuals with developmental amnesia.

Hoerl's premise 4 is also a candidate for blame. Perhaps people gain access to their past personal experiences using cognitive systems besides episodic memory. The working memory system, for example, has resources to maintain information for short stretches of time. The most popular model of working memory (Baddeley & Hitch, 1974) includes slave systems, such as an iconic store for visual information and a phonological loop for short-term auditory memory (such as the digits of a phone number). The working memory system also contains an episodic buffer (Baddeley, 2000) charged with integrating visual, spatial, and verbal information into a temporal sequence. If the episodic buffer in working memory is distinct from the episodic memory system damaged in patients like KC and DB, or if the working-memory system contains other sub-systems that integrate information across time (such as event-segmentation mechanisms; see Kurby & Zacks, 2008),

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19. This battery of tests was generated by Ben Graham and Carl Craver, inspired by Hoerl's discussion, McTaggart's metaphysics, and science fiction.

then working memory might provide independent resources for constructing the concepts of indexical time. Whatever the source of the error, we can now safely reject the thesis that episodic memory is necessary for one to have knowledge of indexical time, which, we can grant, is plausibly central to our familiar conception of human agency.

#### REPRESENTING A PERSONAL FUTURE OF VALUE<sup>20</sup>

The capacity to understand indexical time is no doubt central to a person's understanding of their place in the world and the significance of their actions. Yet one might have the concept that one's life plays out within indexical time and nonetheless fail to take appropriate attitudes with respect to times outside of the present. Diverse researchers increasingly emphasize that episodic memory systems are required not only to recollect past experiences but also to imagine future experiences (Atance & O'Neill, 2001; Hassabis et al., 2007; Suddendorf & Corballis, 2007; Tulving, 1985), though some individuals with episodic amnesia maintain the ability to imagine public future events on the basis of stores from semantic memory (Klein, Loftus, & Kihlstrom, 2002). Individuals such as KC and DB are as impaired at imagining future personal scenarios as they are at recollecting past personal experiences. Furthermore, neuroimaging studies suggest that many of the same brain regions are activated when one imagines future experiences as when one remembers past experiences (Schacter & Addis, 2008, 2009).<sup>21</sup>

Perhaps an individual who cannot imagine a personal future cannot invest it with value.<sup>22</sup> If the ability to assign value to one's future is required for one to make informed choices about the future, one might plausibly conclude on this basis that episodic memory (or thought, more generally) is required for one to be an agent in the full sense.

To test this hypothesis, it is necessary to assess whether people with episodic amnesia evince less concern with the future than do age-matched controls. Preliminary and qualitative evidence (of the sort that reliably taps attitudes about time in non-amnesic individuals; Zimbardo & Boyd, 1999) suggests that KC has concerns beyond the here and now. KC accurately judges that he spends very little time reliving his past successes and shortcomings. However, despite living under his parents' care for the last thirty years, KC shows few signs of a depressive, fatalistic attitude. He regularly and strongly disagrees with the claim that, "Things rarely work out as I expected," as with the claim that "You can't really plan for the future because things change so much." He rejects the claim that "often luck pays

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20. This heading is chosen to reflect the language in Brown (2000).

21. Bratman (1987), for example, emphasizes the centrality of planning to agency and intentional action. To the extent that the capacity to imagine the future is also required for one to plan for contingencies or novel occurrences, then the inability to imagine the future would have rather direct consequences for one's status as an agent. Yet as I argue, it remains to be shown that a person incapable of imagining a personal future is incapable of planning for the future in the required sense. Again, the relevant data is currently scarce.

22. Boyer (2008) argues that episodic future thought contributes to survival by nudging the value of future rewards up and thereby counteracting the effect of delay discounting. This ingenious hypothesis is difficult to test conclusively in case studies.

off better than hard work." He also tends to abjure hedonistic attitudes. He does not typically find himself "swept up in the excitement of the moment," he does not think that "It takes joy out of the process and flow of my activities if I have to think about goals, outcomes, and products," and he disagrees with the claim that, "Ideally, I'd live each day as if it were my last." In contrast, he readily assents to claims such as, "Meeting tomorrow's deadlines and doing other necessary work comes before tonight's play," and he describes himself as the kind of person who will "keep working at difficult, uninteresting tasks if they will help me get ahead" (as is demonstrated by his patience and persistence in psychological tests).

Though KC shows little concern for his past, he describes himself as someone who values the future and as someone who recognizes that it is often advantageous to trade immediate rewards for greater rewards at a later time.<sup>23</sup> He claims, that is, to have a future of value.

Still, one might question whether KC's professed attitudes about the future are reflected in his actual choices. Perhaps KC knows he is expected to value the future, and reports as much when asked, but nonetheless is unable to forego smaller rewards now in favor of larger rewards later. Samuel Johnson explains why episodic memory places humans in a distinctive, moral sphere:

If we were to act only in consequence of some immediate impulse, and receive no direction from internal motives of choice, we should be pushed forward by an invincible fatality, without power or reason for the most part to prefer one thing to another, because we could make no comparison but of objects which might both happen to be present. (Johnson, 1837/1750, p. 75 in *The Works of Samuel Johnson*, Arthur Murphy, ed., 1837).

People who lack remembrance, Johnson appears to believe, would be stimulus-bound and so unable to make choices between options not present before them.

Johnson's sentiment has been revived in contemporary cognitive science. Peters and Büchel, for example, argue that neural systems (such as the frontal pole and the posterior cingulate cortex) that are thought to be associated with episodic future thought (Schacter & Addis, 2009) might generate neural signals coding for the subjective value of a future reward (Peters & Büchel, 2009, p. 15733). Peters and Büchel find that healthy individuals who are cued to imagine experiences on the day they are to receive a delayed reward tend to value that reward more than do individuals who have not been cued (Peters & Büchel, 2010).<sup>24</sup> Specifically, subjects tend to prefer larger, later monetary rewards when they have been cued to think about how they would use the money. Boyer (2008) argues, in fact, that episodic memory and mental time travel might serve the evolutionary function of modu-

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23. A complete report of KC's results, along with those from other individuals with amnesia and controls, is in preparation (Kwan et al., in production).

24. Such studies have tended to be conducted in protocols that vary the amount of the future reward. Such tasks are potentially confounded by the amount effect, according to which discount rate varies as a function of the amount of the hypothetical reward (Green & Myerson, 2004). Further studies are required to remove this confound.

lating delay discounting, the pernicious tendency to discount the value of future rewards systematically with time (Green & Myerson, 2004).<sup>25</sup>

Though such findings support the hypothesis that episodic future thought can be used to modulate decision-making about hypothetical future rewards, they do not support the hypothesis that episodic future thought is necessary to assign value to hypothetical future rewards. After all, subjects in control conditions continue to value hypothetical future rewards, even if they value them less. To test this version of N, one must evaluate whether individuals with episodic amnesia and corresponding deficits in episodic future thought in fact value real or hypothetical future rewards and, if so, whether they value them to an extent comparable to that seen in controls.<sup>26</sup>

To evaluate this hypothesis, we tested KC repeatedly on a standard protocol for assessing delay discounting (Green & Myerson, 2004; see Kwan et al., 2012). Kwan et al. demonstrate that on tests of delay discounting, KC is willing to exchange an immediate reward for a larger reward at a later time. In fact, his discounting curve (a measure of the rate at which he discounts the value of the future) is statistically within the range of matched controls. Nor is he statistically more variable from one trial to the next than are the matched controls. As would be expected, KC cannot imagine how he would spend the money. After repeated questioning, he says he would put it in the bank. When we ask him what he will do with the money he receives as the day's experiments end, he regularly answers, with half a smile, that he will buy some beer.

Other findings indicate that people with episodic memory deficits are able to track and respect the reward and punishment structures of their environment well enough to guide adaptive choices. Claparède showed that an amnesic individual who had been pricked in the hand with a hidden pin refused to shake hands with the doctor the next day on the grounds that doctors sometimes hide pins in their hands. Damasio et al. describe how the Boswell, an individual with amnesia described by Tranel and Damasio (1990, 1993), learned to favor the friendly and unproblematic hospital employees and to avoid those that seemed disagreeable, despite having no memory of meeting them (Tranel & Damasio, 1990, 1993). Leng and Parkin (1988) argue that people with amnesia exhibit apparently normal performance on the Wisconsin Card Sort Task, which requires individuals to change their behavior in response to reinforcement without explicit instruction from the experimenter.

Although further studies of decision-making in amnesia are required to assess the full range of competencies and deficits in each individual, it would appear on

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25. There is considerable controversy about the ability of people with episodic memory deficits to make advantageous decisions in the Iowa Gambling Task (IGT). This task requires subjects to track wins and losses resulting from choices among four decks, two of which are on-balance advantageous and two of which are on-balance detrimental. Control subjects regularly learn to make choices from advantageous decks. Gutbrod et al. (2006) and Gupta et al. (2009) show that a number of amnesic patients tend to perform at chance on the IGT. Turnbull and Evans (2006) show, however, that one patient with profound anterograde amnesia for declarative memories (SL) exhibits normal performance on the IGT, even over 200 trials. The complexity of the IGT and differences among people with amnesia make it difficult to understand why some amnesics fail and why at least one individual with amnesia succeeds. I therefore focus on more basic components of IGT decisions, such as the ability to assign values to rewards and to make choices among them.

26. Subjects vary considerably from one another in their discount rates (Green & Myerson, 2004).

the basis of current evidence that individuals with episodic amnesias, even global episodic amnesias, can form a sense of the passage of time, can value the future, and can make choices that show regard for nonimmediate rewards. The fact that episodic memory systems are likely involved in the construction of imaginary personal events does not entail that individuals with episodic memory deficits have no regard for their personal futures. Just as memory is an umbrella term for many kinds of relation to the past, future thought is not a single psychological capacity. One might lose the ability to imagine events in one's personal future but retain other ways of thinking about and assessing our lives to come.

## 7. CONCLUSION

It is possible to formulate testable conjectures about the role of episodic memory in making selves, persons, and agents. Such conjectures can then be tested against evidence from studies involving individuals with episodic amnesia. The finding that an individual with global episodic amnesia, anterograde and retrograde, does (in fact) maintain the significant capacity falsifies the conjecture. Evidence of preserved competence in individuals with episodic amnesia has led us to reject several common-sense and intuitive philosophical conjectures about how episodic memory is required to live the life of a person, self, or agent. In this paper, this method has been used to reject versions of N pertaining to synchronic identity, diachronic identity, the self-concept, trait self-knowledge, self-narrative, the concept of time, delayed gratification, risk assessment, and valuation of the future.

Yet this remains a preliminary defense of the amnesic self. One can reformulate N to accommodate the current findings and make new predictions about what one should and should not expect in the behavior of individuals with episodic amnesia. This iterative process can be used to sharpen our assessment of if, and if so, how episodic memory makes a necessary contribution to our being selves, persons, and agents.<sup>27</sup>

Though the results of the present review are negative, and though they leave open the possibility that some formulation of N might be true, the pattern of argument illustrates a method that might marry philosophical debates about the nature of the self, personhood, and agency with the empirical study of individuals with cognitive deficits. Given a particular conception of the person, self, or agent, one can ask: Which cognitive capacities are and are not required for one to deserve such a status? Clinical moral psychology can thus proceed using the same methods that have guided cognitive neuropsychology for generations. The method is as follows: seek out individuals who have lost or failed to develop cognitive mechanisms of the requisite sort, and determine whether such individuals can indeed live up to the standards set by a particular conception of the person, self, or agent. If even one such individual can live up to the standards in that case, then one has all the evidence one needs that the cognitive capacity in question is not required for one to be a person, self, or agent in the specified sense.

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27. Or, as Sellars (1962) expressed it, of relating manifest and a scientific image of Man in the world.

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