

The sense of diachronic personal identity

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Abstract In this paper, I first consider a famous objection that the standard interpretation of the Lockean account of diachronicity (i.e., one's sense of personal identity over time) via psychological connectedness falls prey to breaks in one's personal narrative. I argue that recent case studies show that while this critique may hold with regard to some long-term autobiographical self-knowledge (e.g., episodic memory), it carries less warrant with respect to accounts based on trait-relevant, semantic self-knowledge. The second issue I address concerns the question of diachronicity from the vantage point that there are (at least) two aspects of self—the self of psycho-physical instantiation (what I term the *epistemological* self) and the self of first person subjectivity (what I term the *ontological* self; for discussion, see Klein SB, The self and its brain, *Social Cognition*, 30, 474–518, 2012). Each is held to be a necessary component of selfhood, and, in interaction, they appear jointly sufficient for a synchronic *sense* of self (Klein SB, The self and its brain, *Social Cognition*, 30, 474–518, 2012). As pertains to diachronicity, by contrast, I contend that while the epistemological self, by itself, is precariously situated to do the work required by a coherent theory of personal identity across time, the ontological self may be better positioned to take up the challenge.

Keywords Self · Identity · Diachronicity · Memory

The metaphysicians...affirm that if memory be taken away, the self is lost. [But] what matter for memory? What have I to do with that part? If, whilst I am, I am as I should be, what do I care more? And thus let me lose self every hour, and be 20 successive selfs, or new selfs, 'tis all one to me: so [long as] I lose not my opinion [i.e. my overall outlook, my character, my moral identity]. If I carry that

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with me 'tis I; all is well....—The now; the now. Mind this: in this is all. (Earl of Shaftesbury, 1698; cited in Strawson 2008, p. 198, parenthetical comments not in original).

According to prominent accounts of personal identity, what makes a person at one time *sense* or *believe* that he or she is the same as a person at another time is taken to depend on the presence of certain psychological connections (for reviews, see Bernecker 2010; Klein and Nichols 2012; Noonan 1989; Olson 2007; Parfit 1984; Slors 2001). The most important psychological connection, according to most theorists, is memory—what makes me the same person from one time to another depends, in large part, on my ability to remember past experiences (e.g., Fivush and Haden 2003; Parfit 1984; Sani 2008; Shoemaker 1970). The most famous version of this view can be traced back to a passage in Locke:

Personal identity—that is, the sameness of a rational being—consists in consciousness alone, and as far as this consciousness can be extended backwards to any past action or thought, so far reaches the identity of that person. (Locke 1689 Bk. II, Ch. 27, Sec. 9).

Although there is dispute about exactly what Locke had in mind, the passage usually is taken to involve a person *remembering* his or her past action or thought (e.g., Lewis 1986; Shoemaker 2008), that is, what cognitive psychologists now call episodic memory (e.g., Tulving 1972, 1983). Building on this reading, a prominent interpretation of Locke's view goes as follows: A person at one time, P_2 at T_2 , is the same person at an earlier time, P_1 at T_1 , if and only if P_2 can remember having done and experienced various things performed by P_1 .

For example, neuroscientists Squire and Kandel (1999) argue that memories for past experiences, thoughts, and actions constitute the identity of the self, or person, over time:

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 (Squire and Kandel 1999, p. ix).

In this paper, I focus on the memorial bases of diachronic personal identity. In psychological (e.g., Duval et al. 2012; Haddock et al. 2010; Haslam et al. 2010; Klein 2012; Klein and Lax 2010; Rathbone et al. 2009; Sani 2008) and philosophical (e.g., Brennan 1985; Butler 1736/1819; Dainton 2008; Klein and Nichols 2012; Lund 2005; Reid 1785; Schechtman 1996; Shoemaker and Swinburne 1984; Olson 2007) discussions, long-term memory often is seen as playing the critical *evidential* role in knowledge of numerical personal identity. However, the nature of the implicated long-term memory system(s) has been vague. Recent work on amnesic patients begins to shed light on the matter (e.g., Haslam et al. 2010; Klein 2001, 2004, 2012; Klein and Lax 2010; Rathbone et al. 2009). I will review evidence that different memory systems are involved in tracking the self and that recent case studies suggest

quite specialized memorial mechanisms may be involved in the *sense* of numerical personal identity with a person in the past.

I then return to the question of personal diachronicity, arguing that there are (at least) two aspects of self—the self of psycho-physical instantiation (what I term the *epistemological* self) and the self of first person subjectivity (what I term the *ontological* self; for discussion, see Klein 2012). Each is held to be a necessary component of selfhood, and, in interaction, they appear jointly sufficient for a synchronic *sense* of self (Klein 2012). With respect to a *sense* of personal diachronicity, I argue that while the epistemological self, by itself, is poorly positioned to do the work required by a coherent theory of personal identity across time, the ontological self may be better suited to take up the challenge (e.g., Klein 2012; Strawson 2011a).

Problems with Locke’s psychological connectivity theory of personal identity

Lockean theory holds that what makes a person the same across time is relations of memory. It is by memory or consciousness of a past action that I am identical with a past person. However, as Locke’s critics were quick to note, this account seems to rely on a vicious form of circularity (Butler 1736/1819; Reid 1785). For a mental state to count as my memory of a past action, it has to be the case that I was the one who performed the past action. If it was not me who performed the action, then my apparent recollection is simply a mistake, not a memory. As Butler put it, “one should really think it self-evident, consciousness of personal identity presupposes, and therefore cannot constitute, personal identity” (p. 290). If memory presupposes sameness of self, then trying to give an account of identity in terms of memory seems hopeless.

Although philosophers agree that the circularity objection is a serious problem for a simple Lockean theory, a number of theorists still favor a psychological continuity account of diachronic personal identity (as opposed to, say, bodily accounts; e.g., Olson 2007). Accordingly, numerous emendations have been proposed to rein in the tautology identified in the simple Lockean account (e.g., Bernecker 2010; Brennan 1985; Collins 1997; Grice 1941; Hamilton 1995; Noonan 1989; Quinton 1962; Shoemaker 2008; Stors 2001).

I have discussed the circularity objection at length elsewhere (e.g., Klein and Nichols 2012), as well as provided empirical evidence demonstrating that episodic recollection and the self are contingently, but not logically intertwined. For example, in Klein and Nichols (2012), we presented the case of patient R.B. who, as a result of a severe head injury, possessed recollective experience that clearly involved him, but was not felt to be either owned by or belonging to him (additional discussion and documentation of this case can be found in Klein 2012; Klein 2007). This study seriously undermines much of the force of concerns raised by Locke’s critics. However, as noted, these issues bring us far beyond the scope of the present paper and will not be discussed herein.

What I focus on, by contrast, is the well-known criticism that Locke’s identity criterion cannot work due to “gaps” that necessarily occur in our memorial record. Specifically, one of the major challenges facing a theory of personal identity is to

explain how there can be identity of self through apparent changes in self: How can I be exactly the same person as a person who existed 40 years ago, given all of the apparent differences between the person now and the person then? This issue has exercised theorists from the earliest days of the debate.

For example, Hume maintained that it simply makes no sense to claim that there could be a genuine identity of person across time (Hume 1739). The fact that a person's psychology is constantly changing entails there can be no strict identity across time. Reid and Butler drew the opposite conclusion. They maintained that since there *is* a strict diachronic personal identity, there must be something that really is unchanging. Reid faced the issue directly and maintained that memory provides the evidence for a strict identity of self across time. He writes:

My thoughts, and actions, and feelings change every moment—they have no continued, but a successive existence, but that self or I to which they belong is permanent and has the same relation to all the succeeding thoughts, actions, and feelings, which I call mine....But perhaps it may be said this may all be fancy without reality. How do you know—what evidence have you—that there is such a permanent self, which has a claim to all the thoughts, actions, and feelings which you call yours?

To this I answer, that the proper evidence I have of all this is remembrance, I remember that 20 years ago I conversed with such a person; I remember several things that passed in that conversation: My memory testifies, not only that this was done but that it was done by me who now remember it. If it was done by me, I must have existed at that time and continued to exist from that time to the present" (1785, p. 318).

Thus, Reid, in contrast, takes his memory of past existence as the evidence that he—the exact same self—did exist in the past. Reid is not alone in this, of course. However, Reid also had problems with the Lockean account. For example, he offers the famous criticism often referred to as the Case of the Brave Officer (Reid 1785). Suppose, Reid suggests, a brave officer had been flogged when he was a school boy for robbing an orchard, had vanquished an enemy during a military campaign, and subsequently made a general in later life. Further, suppose also that when he won his military campaign, he was conscious of his having been flogged at school and that, when he was made a general, he was conscious of his military victory but that had absolutely lost the consciousness of his flogging.

On Reid's account, if the sameness of memory (as per his "interpretation" of Locke) is sufficient for sameness of self, if a person at time t_i remembers an event that occurred at time t_1 then the person at time t_i is identical with the person who was witness or agent to the event at time t_1 . Thus, if the brave officer who just vanquished the enemy remembers being beaten at school, then the officer is identical with the boy who was beaten. Following the same logic of transitivity of identity via memory, if the general remembers defeating the enemy in battle, then the general is identical with the brave officer. If the general is identical with the brave officer, and the officer is identical with the boy, then the general is identical with the boy.

However, since the identity of memory is a necessary condition for identity of self, if a person at time t_i does not remember an event that occurred at time t_1 , then the

person at time t_i cannot be identical with any person who was witness or agent to the event at time t_1 . Thus, if the general cannot remember being beaten at school, he cannot be identical with the boy who was beaten. Accordingly, Locke's memory account of diachronicity suffers from a set of mutually incompatible theses—i.e., the General is both identical with and different from the boy.

While philosophers have yet to resolve the logical issues entailed by a memory criterion of personal identity (e.g., Noonan 1989; Strawson 2011a), it is a safe bet that most people probably have the *sense* that they are identical with a person whose past experiences they recall. However, since philosophers are divided on the issue, we have to look elsewhere for the source of this intuition of self-identity in memory. I think neurological case studies can be illuminating in this regard. In particular, there are numerous cases of patients who lack varying degrees of access to episodic memory yet show strong evidence of diachronicity in their *sense* of self as a continuing existent (for extensive review, see Klein 2012). We examine these case studies and their implications for the issue at hand in “[Memory and the sense of personal identity.](#)”

A brief review of systems of memory

Prior to discussing this issue of memory and identity full on, it will be helpful to provide the reader an overview of the way in which contemporary cognitive and neuroscience conceptualizes how knowledge is represented in and retrieved from memory. To this end, I have chosen to address these questions within the context of the position that long-term memory consists in multiple systems (for reviews of the memory systems debate, see Baddeley et al. 2002; Foster and Jelicic 1999; Schacter and Tulving 1994).

Tulving's (1983, 1993a, 1995) widely adopted idea of memory systems distinguishes two types or systems within what has been termed the declarative component (e.g., Cohen 1984; Squire 1987) of long-term memory: Episodic and semantic (for reviews, see Baddeley et al. 2002; Cermak 1984; Furlong 1951; Schacter and Tulving 1994). Semantic memory contains relatively generic, context-free knowledge about the world, such as *Grapes are edible*, $2 + 2 = 4$ and *Sacramento is the capital of California*. Semantic memory usually lacks a source tag, i.e., it is experienced as knowledge without regard to where and when that knowledge was obtained (e.g., Perner and Ruffman 1994; Tulving 1983; Wheeler et al. 1997). Semantic memory makes typically no reference to the self; it can, however, contain propositions expressing facts about the self (e.g., *Stan Klein was born in New York*), just as it can about other things in the world. But this information is known in the same way that one knows that $2 + 2 = 4$; it is not recollected or re-experienced vis-à-vis the context in which it originally was learned.

By contrast, episodic memory records events as having been experienced by the self at a particular (and unique) point in space and time; when retrieved, these events are re-experienced in a quasi-perceptual way, with conscious awareness that “this happened to *me*” (e.g., Klein 2004; Suddendorf and Corballis 1997; Tulving 1983, 1995). Every episodic memory, by definition, entails a mental representation of the self as the agent or recipient of some action or as the stimulus or experiencer of some

state. An example of episodic memory would be *I recall having met with Emily last Monday at my office.*

Not surprisingly, it is the episodic component of long-term memory that historically has been the focus of interest for psychologists studying the relation between self and memory. This is because retrieval from episodic memory is assumed to have a self-referential quality thought to be largely absent from other types of long-term memorial experience (i.e., semantic and procedural; for discussion, see Klein et al. 2002a).

By contrast, semantic memory traditionally was assumed to not be accompanied by awareness of re-experiencing one's personal past (e.g., Klein 2004; Perner and Ruffman 1994; Tulving 1993a; Wheeler et al. 1997). I may *know* where I was born, but I do not know this by virtue of having recalled or re-experienced my birth. That is why this bit of personal history would be considered semantic knowledge, despite its being about oneself. However, as we now know (for reviews, see Klein and Loftus 1993; Klein and Gangi 2010; Klein and Lax 2010), semantic memory also contains a variety of self-referential information such as fact about the self (e.g., "*I was born in New York,*" "*My first job was XXX*")—thus rendering the assumption that episodic memory and the self share a *unique* relation tenuous at best.

Memory and the sense of personal identity

Neurological case studies can help shed light on issues implicated in theorizing about diachronic personal identity. As this section hopefully will show, episodic recollection cannot, by itself, do the work needed for underpinning a person's sense of identity over time. There simply are too many cases of patients with episodic amnesias who do *not* appear to lose their sense of diachronicity despite (sometimes enormous) gaps in that knowledge base (e.g., Klein et al. 1996; for reviews, see Craver 2012; Klein 2012; Klein and Gangi 2010). Given the existence of neurological evidence to the contrary (i.e., individuals with *total* lack of access to episodic memory, yet intact diachronic identity—see below), arguments prevalent in the psychological literature basing diachronic identity on episodic recollection (in particular the narrative and autobiographical memory literatures—for reviews, see Fivush and Haden 2003; Rubin 1996; Markowitsch and Welzer 2005) are shown to be inadequate (for review, see Klein 2012; Klein and Lax 2010). While episodic memory may be necessary aspect of a (personally or socially motivated) *evidential proof* of numerical identity with a past person, neurological cases of memory impairment suggests that episodic memory, to varying degrees, can be lost absent corresponding loss a *sense* of personal identity (for most recent reviews of this evidence, see Craver 2012; Klein 2012). An abundance of empirical evidence and logical inference (e.g., the memorial gaps identified by Reid and others) makes it clear that episodic memory, per se, clearly is not necessary for a *feeling* of personal continuity.

Before abandoning a memorial basis for diachronicity, it is important to keep in mind that the self is represented by a number of systems and subsystems within long-term memory (for reviews, see Gillihan and Farah 2005; Klein 2004; Klein et al. 2004; Klein and Gangi 2010; Rathbone et al. 2009). Within semantic memory, for

example, there are (at least) two different kinds of self-related memories. First, we have semantic factual knowledge of the self—e.g., the memory that *I am 37 and live in Goleta*. This kind of memory is dissociable from a second kind of semantic self-knowledge, knowledge of one's own traits (e.g., Klein and Lax 2010).

There now exists an extensive database showing that patients suffering even complete episodic amnesia can access and describe facts about themselves and their personal characteristics both reliably and accurately (e.g., Klein et al. 2002c; Tulving 1993b; for reviews, see Klein 2004; Klein and Lax 2010). Accordingly, semantic self-knowledge might be a system that offers the continuity of memory required for diachronicity in the face of episodic impairment. A number of psychological investigators recently have drawn this conclusion—that is, a sense of personal identity may be maintained by semantic self-knowledge in the absence of partial (i.e., “gappy”: for discussion, see Slors 2001) episodic recollection (e.g., Duval et al. 2012; Haddock et al. 2010; Haslam et al. 2010; Illman et al. 2011; Klein and Lax 2010; Rathbone et al. 2009.)

However, even finer resolution comes from the finding that individuals suffering loss of *both* episodic and factual semantic knowledge maintain a coherent and extended *sense* of self (although they cannot episodically or factually support their *sense* when explicitly requested to do so; e.g., Klein 2012). The empirical basis for this assertion comes from research over the past 20 years showing that the semantic memory system contains a specific subsystem that stores information about one's personality in the form of trait generalizations (e.g., *Self: Usually stubborn*). These trait summaries form a fast access database, which provides quick answers to decision processes that require trait judgments (for review, see Klein and Loftus 1993; Klein et al. 2002a; Klein and Gangi 2010). This system delivers a qualitative sense of the self given by precomputed summaries of the dispositions one manifested in various behavioral episodes.

Consider, for example, the case of patient D.B. (e.g., Klein et al. 2002c). At the time of testing, D.B. was a 79-year-old man who became profoundly amnesic as a result of anoxia following cardiac arrest. Both informal questioning and psychological testing revealed that D.B. was unable to consciously recollect a *single* thing he had ever done or experienced from any period of his life. In addition to his dense retrograde episodic amnesia, he also suffered severe anterograde episodic memory impairment, rendering him incapable of recollecting events that transpired only minutes earlier (for fuller discussion of this case and its various aspects, see Klein 2004; Klein and Gangi 2010).

To test D.B.'s semantic self-knowledge, we asked him on two separate occasions to judge a list of personality traits for self-descriptiveness. We also asked D.B.'s daughter (with whom he lives) to rate D.B. on the same traits. Our findings revealed that D.B.'s ratings were both reliable and consistent with the way he is perceived by others (for full discussion and analyses, see Klein et al. 2002c). D.B. thus appeared to have accurate and detailed knowledge about his personality despite the fact that he had no conscious access to any specific actions or experiences on which that knowledge was based.

D.B. manifests a clear dissociation between episodic and semantic self-knowledge. But can semantic knowledge of one's own personality traits dissociate from other types of semantic self-knowledge? Further testing of D.B. suggests that it can. D.B.'s

semantic memory also was affected by his illness, although this impairment was less severe than that affecting his episodic memory. For example, although he knew a variety of general facts about his life, he showed a number of striking gaps in his life story: He knew the name of the high school he attended and where he was born, but could not recall the names of any friends from his childhood or the year of his birth. He also showed spotty knowledge of facts in the public domain. For example, although he was able to accurately recount a number of details about certain historical events (e.g., the Civil War), his knowledge of other historical facts was seriously compromised (e.g., he claimed that America was discovered by the British in 1812). Despite these impairments in D.B.'s (a) more general semantic knowledge and (b) his factual semantic self-knowledge, his knowledge of his own personality was intact. These findings suggest dissociation *within* semantic memory—between, on the one hand, general semantic knowledge and semantic factual self-knowledge and, on the other hand, semantic knowledge of one's own personality traits.

In short, D.B.'s case goes well beyond the usual episodic/ semantic distinction to suggest category-specific dissociations within semantic memory (e.g., Caramazza and Shelton 1998). His ability to retrieve trait self-knowledge is intact; his ability to retrieve his daughter's traits is impaired; and his knowledge about the world at large (and specific facts about himself) is impaired. This pattern suggests that the human cognitive architecture includes a subsystem of semantic memory that is functionally specialized for the storage and retrieval of trait self-knowledge (additional evidence is provided by Klein and Lax 2010).

These gaping holes in D.B.'s corpus of self-knowledge were met by him with the confusion, concern, and fear one would expect from a coherent, conscious individual not able to fully comprehend the changes wrought by a disease of which he was only vaguely aware. He was greatly troubled by the absence of information that, as D.B. describes it, "I don't know, but I should, shouldn't I?" (D.B. often broke down in tears over his inability to recollect knowledge of his personal past); information, in short, that failed to inform his subjective self-awareness. Fortunately, despite this cognitive chaos with regard to both self- and impersonal knowledge, as a result of his profound anterograde and retrograde amnesia, D.B.'s concern over lapses of memory (both personal and public) never lasted long. If his attention was diverted from his memory issues for a few moments, he lost track of the vacancies in memory and could be easily induced to redirect his focus on new, less troubling, thoughts or objects.

Yet, D.B.'s actions with regard to his cognitive inabilities strongly suggest a person not at all comfortable with the self he *currently* inhabits. As he says when queried about his inability to recollect personal events, "I should, shouldn't I?" Apparently, his current sense of self is perceived as incongruent with his past sense of whom and what he was. For example, in response to my query "Do you feel as though you are the same person you were before you're heart attack (he has acquired semantic knowledge of his cardiac arrest) and the person you will be in the future?," D.B. replied (following some requests for clarification), "If you mean, am I the same person...well not really. I have these head issues you know...can't seem to remember like I use to. But if you mean have I, D.B. (for confidentiality, this is not the name he actually used), lived a long life...well, of course. And I hope to keep at it." This clearly is not a person unaware of his temporal persistence; he is concerned about the fate that has befallen his apparently intact sense of an enduring self.

As discussed, D.B.'s access to personal memory largely was restricted to semantic trait self-knowledge. His episodic memory was completely obliterated from consciousness, and his semantic factual self-knowledge was spotty at best. Interestingly (and, to date, inexplicably), trait self-knowledge turns out to be unusually resilient across dramatic damage to memory systems (both episodic and semantic; for review, see Klein and Lax 2010). Indeed, examining a variety of neurological disorders (e.g., amnesia, autism, attention deficit-hyperactivity disorder, Alzheimer's dementia, prosopagnosia), my colleagues and I have yet to find a patient who could not reliably and accurately report his or her trait self-knowledge (for review, see Klein and Lax 2010). For example, following his memory impairment, patient R.B. also indicated he possessed both accurate and reliable trait self-knowledge. Perhaps, semantic trait self-knowledge provides the bedrock from which a *sense* of diachronicity springs.

In sum, although episodic and semantic facts about the self may be capable of providing a person with an occurrent or synchronic sense of self (e.g., Klein 2012; for discussion, see Neuhauser 1990), they do not appear to be necessary conditions for diachronic personal identity. This is the case despite evidence suggesting that the Lockean circularity issue can be circumvented (e.g., Klein and Nichols 2012). The fact that D.B. lacks episodic memory and certain forms of semantic personal memory (i.e., factual), yet maintains some diachronic sense of self (possibly provided by semantic trait self-knowledge) warrants the conclusion that one does not need episodic or factual semantic self-knowledge to have a sense of self-continuity. However, it is important to keep in mind that the finding that semantic trait self-knowledge may be sufficient for diachronic personal identity does imply that episodic memory is not. To argue that episodic memory is neither necessary nor sufficient, one would need to find a case in which a person has episodic memory but *no* semantic memory and that under these circumstances a sense of personal diachronicity was absent. Such a case, however, is not found in the annals of neuroscience or neuropsychology (and I am not sure that a situation in which a person has intact episodic memory accompanied by *complete* absence of semantic memory is...on definitional, linguistic, and/or phylogenetic grounds—possible).

In short, long-term memory (with the possible exception of semantic trait self-knowledge), due to its potential for loss *without* accompanying loss of sense of identity, appears unnecessary for a *sense* of personal identity across time (for a similar conclusion, see Craver 2012).

Summing up

In this section, I have attempted to isolate a critical psychological system (or systems) underlying judgments of diachronic identity. It is of course, a further question whether such a system, if it exists, really does provide good reason to think that we enjoy numerical identity with past persons. Providing *reasons* for continuity (e.g., via memory) is not the same as *feeling or sensing* oneself to be a continuing existent. Knowing the nature of the system or systems that deliver continuity judgments might be an important source of information for evaluating whether a system *could* be reliable indicator of numerical personal identity. But whether system-based information underpins ones *sense* of identity is a very different question.

Reconsidering the Lockean criterion on Locke's terms

It is critical to be clear that the above discussion of diachronicity trades on the notion that (a) there is a self whose existence might be experienced as one of temporal continuity and, equally important, (b) that Locke's use of the word "consciousness" is fruitfully interpreted as referring to what social scientists and philosophers call memory. In what follows, I take issue with both assumptions and then return to a candidate mechanism for underwriting the sense of personal identity.

The two selves: the neural self of science and the subjective self of first person phenomenology

What is the self that has captured the imagination of investigators and theoreticians in a large array of academic disciplines (for review, see Klein and Gangi 2010). As philosophers who study the self (both from Eastern and Western philosophical traditions) have made clear, the answer is elusive at best. Indeed, some are of the opinion that the entire enterprise of defining or describing a self is based on the illusion that there is an elusive self to be described (e.g., Metzinger 2009; for recent discussions, see Siderits et al. 2011). Of course, the problem with this approach is that an illusion is an experience, and an experience would appear to require an experiencer (e.g., Strawson 2011b).

While psychology seems determined to put the term "self" to work in an abundance of subject–predicate (i.e., self-hyphen) relations (e.g., self-comparison, self-concept, self-esteem, self-handicapping, self-image, self-perception, self-regulation, self-reference, etc.), the focus of these research endeavors rests firmly on the predicate rather than the subject, to the detriment of a better understanding of the self and its causal potencies. But what exactly is the "self" that serves as the object of this diverse set of predicates: What is it that is being verified, conceptualized, esteemed, deceived, verified, regulated, and handicapped? Sadly, psychology has little to offer in the way of explication (for a review, see Klein and Gangi 2010).

This is not to say that psychology has failed to offer theoretical models of the self, per se. Psychological formalizations of self have been on display for more than 100 years (e.g., Conway 2005; Greenwald 1981; James 1890; Klein and Gangi 2010; Neisser 1988). Yet, the elusive nature of the self has resulted in most (though not all) of these offerings focusing primarily on explicating the "self" in its assumed causal or foundational relation to a *specific* set of predicates, processes, or contexts (cf., Leary and Tangney 2003). We thus find models of contextualized selves, cultural selves, social selves, cognitive selves, autobiographical selves, social selves, narrative selves, etc. But attention to what the self that serves as the bedrock for these cultural, social, cognitive, synaptic, and narrative instantiations is, too often is left under-specified (for discussion, see Klein and Gangi 2010; Klein 2012).

Of course, conceptual difficulties surrounding the question of to what the term "self" refers have been a persistent thorn in the side of theorists (both Western and Eastern) for more than 2,500 years (for review, see Sorabji 2006)! The failure to provide satisfactory resolution to this longstanding problem has led some to wonder whether a conceptual understanding of self is possible in practice (e.g., Olson 1999) or even in principle (e.g., McGinn 1991).

One of the problems in describing what we mean by the word “self” is that there may not be a single self to found. Rather, as I discuss at length in Klein (2012), the self meaningfully can be construed as consisting in two aspects—the *epistemological* (i.e., the neurally instantiated) and the *ontological* (i.e., the first person subjectivity) of our sense of self. As discussed at length below, these two aspects of self cannot be deduced from or reduced to a single, underlying principle, form, framework, structure, system, etc. They each have an independent metaphysical status. But it also is the case that they interact and that both aspects, in interaction, are a prerequisite for subjective personal experience. Indeed, it is *only* via this interaction that a particular form of consciousness—self-awareness—becomes possible (this assertion is discussed and defended at length in Klein 2012; see also Gallagher and Zahavi 2008).

I turn attention first to what can be asserted with reasonable scientific warrant about the self. Specifically, I discuss what I call the epistemological aspect of self—the behavioral, affective, cognitive, and neural systems (i.e., those aspect of self which were the focus of the previous sections of this paper) assumed to be causally responsible (at least in part) for providing the ontological aspect of self (i.e., the conscious, phenomenological self of first person experience—see below) with knowledge of whom and what it is (for reviews, see Dainton 2008; Husserl 1964; Klein 2012; Strawson 2009). I then point out a well-known logical inconsistency between conflating self as the subject of experience (i.e., an object) with the self as the agent of experience (i.e., a subject; for detailed treatment, see Gallagher and Zahavi 2008; Klein 2012; Zahavi 2005).

The epistemological self—types of self-knowledge

It is a fact of scientific inquiry and personal experience that the self of an individual is able to learn about the individual in which it is situated and even experience itself as a knower (for a classic treatment, see, James 1890; more modern accounts can be found in Rosenthal 1991). Scientific accounts of the mechanisms, databases, and search engines that allow information about the self to be acquired, stored, and retrieved are flourishing in academic psychology, even if troubling ontological issues remain mostly unaddressed (e.g., Klein 2012; Klein and Gangi 2010).

In particular, considerable progress has been made on the cognitive and neurological bases of the epistemological self (for review, see Klein and Gangi 2010). This is because, unlike ontological questions, properties of the epistemological self—i.e., neurological bases of self-knowledge—are empirically tractable, and thus amenable to scientific analysis. Not surprisingly, scientific exploration of neuro-cognitive systems underlying knowledge of whom and what we are constitute the majority of the thousands of papers published on the self since Gergen’s (1971) survey of the use of self and related cognates (e.g., identity, ego) as topics of empirical and theoretical investigation in psychology.

As noted in the previous section, there is a diversity of self-predicated terms that have received empirical attention in psychology. And, herein resides an apparent paradox—the self as a subjective, singular point of view (i.e., the ontological self) is informed by, and perhaps partially constituted from, a multiplicity of neural sources (i.e., the epistemological self; for reviews, Klein and Gangi 2010; Klein and Lax 2010), yet we

experience the ontological self as a phenomenological unity (e.g., Lund 2005; Stawson 2005).

For example, neuropsychological studies of self suggest that the singular self of everyday experience actually is informed by a number of different, functionally isolable neuro-cognitive systems (e.g., Klein 2004; Klein and Gangi 2010; Klein and Lax 2010). These include, but are not limited to:

1. Episodic memories of one's life events.
2. Semantic summary representations of one's personality traits.
3. Semantic knowledge of facts about one's life.
4. An experience of continuity through time: the "I" experienced now is connected to the "I" experienced at previous points (as well as later points) in one's life. Episodic memory is known to contribute heavily to this ability, although semantic memory makes a contribution as well.
5. A sense of personal agency and ownership: the belief—or experience—that "I" (agency) am the cause of "my own" (ownership) thoughts and actions.
6. The ability to self-reflect: to form metarepresentations where the agent is the self, and make inferences on the basis of those representations.
7. The physical self: the ability to represent and recognize (e.g., in mirrors, photographs) one's body.
8. The emotional self: the ability to experience and produce emotional states (both transient and dispositional) that provide value, affective valence, and evaluative direction to our actions and reasoning.¹

Although these sources each contribute to the experience of self as a subjective singularity, taken individually, they are functionally independent. That is, while in normal individuals, sources of self-knowledge (i.e., the epistemological self) work together to help create our sense of self as a subjective unity (e.g., Damasio 1999), taken separately, none of these systems are either logically or empirically necessary to maintain the experience of the self as a singular, subjective point of view (for example, see discussion in "A brief review of systems of memory" of this paper; see also, Klein 2012; Klein and Gangi 2010).

The ontological self

By contrast, the ontological self, the self of personal experience, is too poorly understood to bear the definitional adequacy required of the terms of a causal relation between self and the brain (this contention is discussed at length in Klein 2012). Not surprisingly, many researchers sidestep this difficulty, relying on their readers' familiarity with the term "self" (i.e., the self of subjective experience), derived from years of knowledge of direct acquaintance from personal experience, to confer a sense of confidence that he or she knows to what it is the author refers. But the problem remains—we are unclear what it is we are referring to when we apply the label "self" (nor is the term open to being grasped and thus labeled via scientific objectification).

¹ Full empirical documentation for each of these 8 points is available and, for those interested, references can be found in Klein and Gangi 2010.

Compounding this difficulty, researchers often fail to appreciate that the self as subjectivity—the ontological self—is *not* the object of their experimental tasks. Indeed, it logically cannot be the object of their studies. Objectivity is based on the assumption that an act or object exists independent of any individual's awareness of it; that is, it is something “other” than the self. When objectivity is the stance adopted by the self to study itself, the self must, of necessity, be directed toward what is not the self but rather to some “other” that serves as the self's object. To study myself as an object, I must transform myself into an “other,” into a “not-self.” Thus, the ontological self is not, and cannot, be an object for itself and still maintain its subjectivity (e.g., Earle 1972; Husserl 1964; Klein 2012; Neuhauser 1990; Stawson 2005; Zahavi 2005).²

The ontological self thus would seem a poor candidate for “current” scientific exploration—an enterprise predicated on understanding objects and their relations. Science is the world of publically observable and physically measureable objects and events. Since nothing can be an object for the self unless it is “other” to the self, it follows that the self cannot objectively apprehend itself as itself. For the subjective self to become part of the scientific world, it would have to forfeit its subjectivity. Scientific analysis therefore has the unintended consequence of eliminating the object under discussion—the ontological self—from the discussion (for extended discussion of these points, see Earle 1972; Husserl 1964; Klein 2012).

In short, when scientists focus on the self, more often than not, what they are investigating actually is the multiplicity of social and neural systems assumed to present the ontological self with knowledge. A tacit assumption is that there is a substantive self apprehending this knowledge, a self which, like any object (provided proper tools were available), can be treated as “other” and thus located, grasped, and studied scientifically. While this assumption has merit for the study of epistemological sources of self-knowledge, we often fail to sufficiently appreciate that (a) the subjective self is not an object, but an awareness, a consciousness, and as such is not privy to anyone but itself and (b) that there are important differences between self as a subjective entity and the self as types of knowledge available to that subjectivity. These two aspects of “self” are contingently related, but are not conceptually reducible. By conflating them, we assume that we are casting empirical light on one (the assumed, causally potent focus of our research—that is, the ontological self) while experimentally exploring the other (neural-based sources of self-knowledge—the epistemological self).

² It might strike the reader that my use of the terms “epistemological” and “ontological” in reference to the self are a bit confused. Such concern is warranted particularly with regard to the epistemological self. After all, epistemology refers to the process of acquisition of knowledge. In this light, such a term might seem better reserved for what I have labeled the ontological self. However, I have chosen to use the term “epistemological” self as the designator of self-relevant content (primarily neural in nature), rather than as a *process* of content-extraction. If the reader finds it helpful, she or he may think of the epistemological self and ontological self, respectively, in terms of dichotomies such as “self as object and self as subject,” “self as known and self as knower,” “self as experienced and self as experiencer,” “the self of science and the self of experience,” etc. With respect to the “ontological” self, my intent is that pick out the aspect of self that refers to the first-person subjectivity that is aware of the epistemological self (i.e., the neuro-cognitive instantiation of self-knowledge). The ontological self is able to *know* about specific neuro-cognitive content relevant to first-person subjective experience.

To summarize, I draw a sharp distinction between two aspects of self, aspects whose different properties play a central role in how behavioral scientists should conduct research and theorize about the self. Those aspects are:

1. The Ontological Self—the self experienced as single, subjective, and phenomenologically given (e.g., Earle 1972; Gallagher and Zahavi 2008; Strawson 2009). As self-experience, it entails subjectivity, which, in turn, implies that does it not allow for treatment as an object of analysis (see also Klein 2012; Zahavi 2005). That is, the ontological self is not clearly or easily reducible to neural function. However, it also likely is the case that the ontological self, being the subject of awareness, is informed (in some manner) by experiences both external and internal to the organism. It also is possible that it contributes causally to the organism's thoughts, decisions, and actions (although this latter claim introduces a host of contentious issues about epiphenomenalism, causal closure under physicalism, etc., discussion of which would take us far beyond the scope of this paper; for discussion, Hasker 1999; Klein 2012). This is the self of acquaintance (as per Russell's 1912/1999, classic distinction between knowledge by acquaintance and knowledge by description).
2. Epistemological Self—the assumed neurological bases of self experiences. The epistemological self is propertied by features and processes of the various systems of our psycho-physical bodies. These systems (presumed to be primarily neural) in some way or ways provide the raw, as well as processed, data of self-experience—that is they provide content for the ontological self. From a materialist stance, such aspects of self are amenable to study and constitute the major body of findings that psychologists present when discussing and researching what they term “the” self. This is the self of description.

A possible resolution of the problem of diachronic personal identity

As noted at the beginning of this paper, the assumed circularity of the relationship between self and memory has been a persistent thorn in the side of theorists. How can one examine the relation between the self and memory if the concepts by which they are known and described are inextricably entangled? My proposed resolution is that the assumed circularity is more apparent than real (see “[Problems with Locke's psychological connectivity theory of personal identity](#)”). It can be successfully addressed once one recognizes (a) that circularity is a contingent fact, not a logical requirement of, memory (Klein and Nichols 2012). The contingent nature of the relation is exposed when, under the right conditions, self-referential memory and personal ownership come apart (e.g., the case of patient R.B.), and (b) that the self is not a unitary construct (nor, for that matter is memory; e.g., Klein and Gangi 2010; Tulving 1983). Rather, as previously addressed, it admits to (at least) a twofold instantiation as both epistemological and ontological in nature.

Point b—i.e., the multiple composition of self—suggests another way in which the issue of self/memory circularity may be avoided. Specifically, although epistemological aspects of self are not necessarily occurrent or invariant [with regard to the latter, both Reid and Butler expressed concern that psychological connectedness would fail as a criterion for diachronicity due to gaps (both conscious and unconscious) in the

memorial record], the conscious (i.e., ontological) self is, by definition, both occurrent and temporally invariant (for extended discussion of the temporal invariance of the ontological self, see Klein 2012). A similar view can be found in some Eastern philosophic traditions' treatment of self and consciousness—e.g., Albahari 2006; Siderits 2003; for review, see Siderits et al. 2011).

Galen Strawson (2011a), in a lovely book on Locke, points out that it is prudent to take Locke at his word—to wit, when he posits the continuity of *consciousness* as the bedrock of diachronic personal identity, he means just that: Continuity derives from the invariance of conscious experience (i.e., the ontological component of self), *not* from epistemological (e.g., memorial) sources of self (for example, it should require time to reconstruct a coherent, “sufficiently” unbroken self-narrative; thus, epistemological sources of diachronicity could not provide the immediate *sense* that I am a continuing existent I take it most people refer to when they claim to experience a sameness of self over time). On awakening each morning, I am immediately confronted with the experience of “I.” My *sense* of “I” as a psychological continuant is not something I need to deduce, infer or reconstruct (intentionally or unintentionally; e.g., Berntsen 2009) to justify my feeling of personal continuity. As Heidegger notes, “I am always somehow acquainted with myself” (1993, p. 251). Locke is more direct: “consciousness *alone* makes self” (Locke 1689 Bk. II, Ch. 27, Sec. 9; emphasis added).³

While nonmemory impaired individuals can recollect self-referential information, and may do so for legal, personal, or, more typically, social reasons, such recollections do not appear to be *required* for the *sense* of continuity. During most waking moments, I simply am I, an enduring, conscious presence given to awareness absent inferential reckoning (e.g., Klein 2012; Neuhauser 1990).

Consider, for example, the case of Zasetzky, a Russian soldier in WWII (Luria 1972). As a result of battle, Zasetzky suffered massive neural damage to areas controlling higher cortical functions (for an excellent review, see Jopling 2000). He was aphasic, perceptually and proprioceptively disoriented, hemianopic, and densely amnesic (both anterograde and retrograde). As a result of deficits in proprioception and kinesthetic feedback, Zasetzky also had trouble feeling and locating parts of his own body.

Zasetzky's perception of the external world also suffered serious impairments. Objects external to him either were nonexistent or appeared as fragmented, flickering background entities. In short, he was rendered incapable of access to most sources of epistemic self-knowledge.

According to Luria, Zasetzky struggled to piece together the fragments of a once clear sense of identity and self-understanding with only the slimmest of cognitive resources available to him. Because he had lost most of his episodic and semantic autobiographical memory, his ability to recall his past and plan for his future were virtually nonexistent (e.g., Klein et al. 2002b; Tulving 1985). He also professed to have no clear idea of his preferences, beliefs, values, or goals.

³ This is a strong interpretation of Locke—i.e., that consciousness means consciousness and not memory. Of course, Locke also notes that as far as consciousness can be extended back to any past action or thought, so far reaches the identity of the person. Accordingly, while I adhere to Strawson's interpretation of Locke's use of the word “consciousness,” I acknowledge that Locke's writings do not unambiguously exclude memory from the mix.

Eventually, under the patient tutelage of Luria and others, Zasetzky slowly and painfully regained some rudimentary ability to read, write, and perform basic bodily functions. Consequently, he was able to provide Luria with a record of thoughts and feelings about himself related to the changes to self brought about by damage to his epistemological systems of knowledge.

Although there are many remarkable aspects of this case study, I focus on one with direct relevance to my presumption of a functional independence between the self and its sources of knowledge. Specifically, despite Zasetzky's monumental loss of access to epistemological bases of self, he did not report a corresponding loss of his subjectivity. Rather, he was painfully aware of his deficits and greatly troubled by their effects on his ability to place himself physically, temporally, and spatially. He complained about the personal confusion engendered by impairments of perceptual, kinesthetic, proprioceptive feedback; he was bewildered by his perceived loss of preferences and difficulties imagining his future or recalling his past.⁴ Yet, and this is the key point, at no time was his subjective self-awareness lost (save, perhaps, periods of dreamless sleep): The "I" always was there, troubled, bewildered, angered, and confused by its loss of access to sources of self-knowledge, yet determined to salvage what it could of a life left in cognitive and perceptual shambles. In the end, it was this subjectively felt suffering and personal determination to live a better life that led Zasetzky to undertake an arduous rehabilitative program that enabled him to regain partial contact with the external world and aspects of self-knowledge rendered temporarily unavailable to subjective awareness.

This is strong evidence for the proposition that a person, absent most of what we would place under the heading of "epistemological self" still maintains a clear *sense* of personal identity and continuity. What is particularly noteworthy in this regard is his continual strivings to distance himself from what he has become in the past and recapture a semblance of normality for his personal future.

The timelessness of the ontological self

One fascinating, yet, to my knowledge, unmentioned, consequence of this loss of epistemological self-knowledge (in the form of personal narratives and experiences) is that the ontological self typically is not confused by, or troubled over, the loss of years following the onset of neural trauma and subsequent episodic loss—unless, of course, the patient is directly confronted with evidence of the incongruity between the loss of years and his or her current temporal beliefs (for comprehensive review and discussion, see Klein 2012). Otherwise, the patient appears content to see him or herself as being of the age at which access to a coherent set of personal memories is available to the ontological self.

For example, Oliver Sacks (1985) reported the case of an amnesic patient, J. G., for whom personal recollections postdating 1948 were not available to conscious experience. Despite passage of nearly 30 years since the onset of his anterograde

⁴ It is, of course, an open question whether his trait-self knowledge remained intact. Based on the evidence discussed in "Memory and the sense of personal identity," I assume semantic dispositional self-knowledge was, to some degree, available. However, since Luria offers no evidence in this regard to this particular case study, the question necessarily must remain open.

episodic amnesia, testing by Sacks revealed that J.G. believes he still is a young man and that the year still is 1948. Consistent with his beliefs, on seeing his face in the mirror (i.e., that of a much older man), J.G. is stunned and confused. Fortunately, due to the anterograde component of his amnesia, after a few moments distraction from the image, J.G. once again is relaxed and comfortably situated in 1948.

A comparable picture is revealed by a far more extreme case of episodic memory loss. Patient D.B. (e.g., Klein et al. 2002b; c), as previously discussed, was rendered incapable (within the limits of testing) of recalling a single event from *any* point in his entire life. He was unsure of his age, did not know his past and could not anticipate his future (e.g., Klein et al. 2002b).

Yet, despite these devastating losses of access to epistemological self-knowledge (both episodic and aspects of semantic self-knowledge were affected by his heart attack), D.B. overtly remained unperturbed (except when his memory was tested and his loss thus made apparent). As previously noted, while he lived in the moment, he was not *stuck* in the moment—he was cognizant of his past and future, although he neither could supply an account of particular events from his personal past nor specific imaginings of his personal future. In short, the absence of an ability to recollect a personal past or imagine a personal future did not appear to either trouble or to capture the attention of the ontological self—unless the situation demanded these personal deficits be treated as objects of awareness.

Never do we find a patient who claims to experience himself as much older than his or her intact recollections would suggest; rather, we typically find the reverse—the patient resides in the past (provided he or she has access to some personal recollections) and is troubled only when a discrepancy between the memorial knowledge provided by the epistemological self fails to match current reality. The ontological self seems, for its part, outside of the aging process, accepting what the epistemological self has to offer vis-à-vis personal temporality (a similar case, permitting similar inferences, can be found in Tulving 1993b).

A very unusual amnesic patient (Storring 1936) brings my proposals about the relation between the ontological self and time into strong relief. As a result of gas poisoning accident, patient B. was rendered incapable of remembering anything occurring postinjury for more than roughly one second! Here, we have a totally unprecedented situation in the annals of neurological study—a man, lacking both long-term and short term memory and for whom the life of which he is aware *fully* ended in May of 1926. (For another example of severe amnesia with a similar “take-away” message—see the case of Clive Wearing in Wilson and Wearing 1995)

At the time of his memory testing (mid-1930s), B knew nothing of the life he had lived postpoisoning or of his marriage of 5 years. Unlike other amnesics, possibly resulting from his loss of short-term memory, he could not update his memory implicitly (e.g., Schacter 1987). For example, he is perplexed *every* time he sees himself in a mirror because 10 years earlier, he looked different. Unlike many amnesics, B does not gradually grow accustomed to the changes to his face wrought by the passage of time. For B, it is, and always will be, May 1926.

There are many aspects of this case that merit extensive discussion (not the least of which is B’s existence within the scope of his 1-s consciousness). For my purposes, however, the relevant features of the case pertain to what it can tell us about B’s ontological self, a self whose knowledge of the aging process has been fully

decoupled from changes to the physical self brought about by the passage of time. B's ontological self, no longer having access to these changes, does not show a parallel aging of its own. He has become a man of the eternal present. However, as Storrington (1936) notes at length, B is *not* a man of the moment: "As the rational being that he is after the gas poisoning just as he was before, B. gives meaning to the situation before his senses. And it is this context that reaches from one second to the next that creates the flowing transition. A sensible, reasonable task is harmoniously carried to its completion, regardless of how long it takes, because—the rational whole is known in the situation as a goal which is then fulfilled" (Storrington 1936, pp. 75–76).

This is a person, Storrington concluded, with a second-long consciousness that nevertheless has an awareness of the continuity of his experiences. The ontological self, anchored in the past by disruption of sensory and cognitive processes, nevertheless, remains a continuous, experiencing, feeling, thinking center of subjectivity unperturbed by the passage of time.

We should not draw from these observations that the ontological self is immortal or transcendental. It may well be incapable of existing apart from the body (e.g., Olson 2007). It may be an emergent property (e.g., Clayton 2004; Hasker 1999) of the epistemological self, but this emergence—if indeed it is emergence—is something we clearly do not know how to deal with in the context of current theory and research in science or philosophy. In short, we are a long way off from even beginning to formulate, much less answer, questions about the ontological self—our consciousness of ourselves as planning, thinking, feeling, judging, unique subjectivities. Yet these, in my opinion, are the essential questions for a psychology viewed as the attempt to obtain a full understanding of human experience.

To summarize, if one accepts the proposition of the self of ontology as ageless (for a more detailed discussion and evidence, see Klein 2012), then diachronicity *per se* is not actually a live issue for one's *sense* of self. It becomes an issue for lived experience only when a person attempts to supply or justify (either to self or to other) *evidential support for personal continuance* (e.g., from memory—the epistemological self).

Returning to Locke, consciousness supplies a *sense* of personal synchronicity; and since that synchronic sense is ageless (invariant with respect to age but changing with regard to its experienced content; e.g., James, Fichte, and many others), diachronicity is not really *sensed* at all. It is accepted, intuitively, as a simple fact of a constant sense of—to use a phrase provided in a personal communication from Professor Galen Strawson—"and now and now and now." Personal diachronicity and personal narrativity come into play only at the *evidential* level (and so gaps are not really, as per Lockean detractors, an issue requiring theoretical attention). We typically do *not* consider ourselves, in our personally experienced *sense* or *feeling*, to be different over time. If we do so, and thus require some mechanism of connectivity, we do so *only* when evidence is put to a test—by self or other.

Conclusions

Regardless how the debate turns out, it is clear that (a) a variety of memory (e.g., semantic trait-self-knowledge) and nonmemory (e.g., physical features, ownership,

agency, image) self-referential factors have yet to be definitively ruled out as bases of self-diachronicity. There is, however, an issue surrounding the type of work that epistemological aspects of self are capable of doing with respect to diachronicity. For instance, while it is not clear whether “personal image” falls victim to the Lockean circularity issue, it also is not clear how image, per se, can provide a sense of diachronicity, and (b) given the presumed temporal invariance of the ontological, self-conscious aspect of self (for extensive discussion of this attribute of the ontological self, see the section in Klein 2012, titled “When am I?: the ontological self and time”), by taking Locke literally at his word (i.e., consciousness means consciousness!), not only can the vicious regress can be broken, but a viable mechanism falls in place that appears sufficient to provide a person with a *sense* that s/he exists, has existed, and will continue to do so.

References

- Albahari, M. (2006). *Analytical Buddhism: The two-tiered illusion of self*. Houndsmills: Macmillan.
- Baddeley, A., Aggleton, J. P., & Conway, M. A. (2002). *Episodic memory: New directions in research*. Oxford: Oxford University Press.
- Bernecker, S. (2010). *Memory: A philosophical study*. Oxford: Oxford University Press.
- Berntsen, D. (2009). *Involuntary autobiographical memories: An introduction to an unbidden past*. Cambridge: Cambridge University Press.
- Brennan, A. (1985). Amnesia and psychological continuity. *Philosophy, Supplementary Volume 11*, 195–209.
- Butler, J. (1736/1819). Of personal identity. In J. Angus (Ed.). *The analogy of religion* (pp. 211–215). London: Allman and Sawers.
- Caramazza, A., & Shelton, J. (1998). Domain-specific knowledge systems in the brain: the animate-inanimate distinction. *Journal of Cognitive Neuroscience*, 10, 1–34.
- Cermak, L. S. (1984). The episodic–semantic memory distinction in amnesia. In L. R. Squire & N. Butters (Eds.), *Neuropsychology of memory* (pp. 45–54). New York: Guilford.
- Clayton, P. (2004). *Mind and emergence*. New York: Oxford University Press.
- Cohen, N. J. (1984). Preserved learning capacity in amnesia: Evidence for multiple memory systems. In L. R. Squire & N. Butters (Eds.), *Neuropsychology of memory* (pp. 83–103). New York: Guilford.
- Collins, A. W. (1997). Personal identity and the coherence of q-memory. *The Philosophical Quarterly*, 47, 73–80.
- Conway, M. A. (2005). Memory and the self. *Journal of Memory and Language*, 53, 594–628.
- Craver, C. F. (2012). A preliminary case for amnesic selves: Toward a clinical moral psychology. *Social Cognition*, 30, 449–473.
- Dainton, B. (2008). *The phenomenal self*. New York: Oxford University Press.
- Damasio, A. R. (1999). *The feeling of what happens: Body and emotion in the making of consciousness*. Orlando: Harcourt.
- Duval, C., Desgranges, B., de LA Sayette, V., Belliard, S., Eustache, F., & Piolino, P. (2012). What happens to personal identity when semantic knowledge degrades? A study of the self and autobiographical memory in semantic dementia. *Neuropsychologia*, 50, 254–265.
- Earle, W. E. (1972). *The autobiographical consciousness*. Chicago: Quadrangle Books.
- Fivush, R., & Haden, C. A. (Eds.). (2003). *Autobiographical memory and the construction of a narrative self: Developmental and cultural perspectives*. Mahwah: Lawrence Erlbaum.
- Foster, J. K., & Jelicic, M. (1999). *Memory: Systems, process, or function?* New York: Oxford University Press.
- Furlong, E. J. (1951). *A study in memory*. New York: Thomas Nelson.
- Gallagher, S., & Zahavi, D. (2008). *The phenomenological mind*. New York: Routledge.
- Gergen, K. J. (1971). *The concept of self*. New York: Holt, Rinehart, & Winston.
- Gillihan, S. J., & Farah, M. J. (2005). Is self special? A critical review of evidence from experimental psychology and cognitive neuroscience. *Psychological Bulletin*, 131, 76–97.

- Greenwald, A. G. (1981). Self and memory. In G. H. Bower (Ed.), *The psychology of learning and motivation* (Vol. 15, pp. 201–236). New York: Academic.
- Grice, H. P. (1941). Personal identity. *Mind*, *50*, 330–350.
- Haddock, G., Newson, M., & Haworth, J. (2010). Do memory-impaired individuals report stable attitudes? *British Journal of Social Psychology*, *50*, 234–245.
- Hamilton, A. (1995). A new look at personal identity. *The Philosophical Quarterly*, *45*, 332–349.
- Hasker, W. (1999). *The emergent self*. Ithaca: Cornell University Press.
- Haslam, C., Jetten, J., Haslam, S. A., Pugliese, C., & Tonks, J. (2010). “I remember therefore I am, and I am therefore I remember”: exploring the contributions of episodic and semantic self-knowledge to strength of identity. *British Journal of Psychology*, *102*, 184–203.
- Heidegger, M. (1993). *Grundprobleme der phänomenologie (1919–1920)*. Gesamtausgabe Band 58. Frankfurt: Vittorio Klostermann.
- Hume, D. (1739/2000) *A treatise of human nature*. In D. F. Norton & M. J. Norton (Eds.), Oxford: Oxford University Press.
- Husserl, E. (1964). *The phenomenology of internal time-consciousness*. Bloomington: Indiana University Press.
- Illman, N. A., Rathbone, C. J., Kemp, S., & Moulin, C. J. A. (2011). Autobiographical memory and the self in a case of transient epileptic amnesia. *Epilepsy & Behavior*, *21*, 36–41.
- James, W. (1890). *Principles of psychology (Vol.1)*. New York: Henry Holt.
- Jopling, D. A. (2000). *Self-knowledge and the self*. New York: Routledge.
- Klein, S. B. (2001). A self to remember: A cognitive neuropsychological perspective on how self creates memory and memory creates self. In C. Sedikides & M. B. Brewer (Eds.), *Individual self, relational self, and collective self* (pp. 25–46). Philadelphia: Psychology Press.
- Klein, S. B. (2004). The cognitive neuroscience of knowing one’s self. In M. A. Gazzaniga (Ed.), *The cognitive neurosciences III* (pp. 1007–1089). Cambridge: MIT Press.
- Klein, S. B. (2007). Phylogeny and evolution: Implications for understanding the nature of a memory system. In H. L. Roediger, Y. Dudai, & S. M. Fitzpatrick (Eds.), *Science of memory: Concepts* (pp. 377–381). Oxford: Oxford University Press.
- Klein, S. B. (2012). The self and its brain. *Social Cognition*, *30*, 474–518.
- Klein, S. B., & Gangi, C. E. (2010). The multiplicity of self: neuropsychological evidence and its implications for the self as a construct in psychological research. *Annals of the New York Academy of Sciences*, *1191*, 1–15.
- Klein, S. B., & Lax, M. L. (2010). The unanticipated resilience of trait self-knowledge in the face of neural damage. *Memory*, *18*, 918–948.
- Klein, S. B., & Loftus, J. (1993). The mental representation of trait and autobiographical knowledge about the self. In T. K. Srull & R. S. Wyer (Eds.), *Advances in social cognition Vol. 5* (pp. 1–49). Hillsdale: Erlbaum.
- Klein, S. B., & Nichols, S. (2012). Memory and the sense of personal identity. *Mind*, in press.
- Klein, S. B., Loftus, J., & Kihlstrom, J. F. (1996). Self-knowledge of an amnesic patient: toward a neuropsychology of personality and social psychology. *Journal of Experimental Psychology: General*, *125*, 250–260.
- Klein, S. B., Cosmides, L., Tooby, J., & Chance, S. (2002a). Decisions and the evolution of memory: multiple systems, multiple functions. *Psychological Review*, *109*, 306–329.
- Klein, S. B., Loftus, J., & Kihlstrom, J. F. (2002b). Memory and temporal experience: the effects of episodic memory loss on an amnesic patient’s ability to remember the past and imagine the future. *Social Cognition*, *20*, 353–379.
- Klein, S. B., Rozendale, K., & Cosmides, L. (2002c). A social-cognitive neuroscience analysis of the self. *Social Cognition*, *20*, 105–135.
- Klein, S. B., German, T. P., Cosmides, L., & Gabriel, R. (2004). A theory of autobiographical memory: necessary components and disorders resulting from their loss. *Social Cognition*, *22*, 460–490.
- Leary, M. R., & Tangney, J. P. (2003). *Handbook of self and identity*. New York: Guilford.
- Lewis, H. D. (1986). *The elusive self*. PA: The Westminster Press.
- Locke, J. (1689-1700/1975). *An essay concerning human understanding*. Ed. P. Nidditch. Oxford, UK: Clarendon Press.
- Lund, D. H. (2005). *The conscious self*. Amherst: Humanity Books.
- Luria, A. R. (1972). *The man with a shattered world*. Cambridge: Harvard University Press.
- Markowitsch, H. J., & Welzer, H. (2005). *The development of autobiographical memory*. New York: Psychology Press.
- McGinn, C. (1991). *The problem of consciousness: Essays toward a resolution*. Oxford: Blackwell.
- Metzinger, T. (2009). *The ego tunnel: The science of mind and the myth of the self*. New York: Basic Books.
- Neisser, U. (1988). Five kinds of self-knowledge. *Philosophical Psychology*, *1*, 35–59.
- Neuhouser, F. (1990). *Fichte’s theory of subjectivity*. New York: Cambridge University Press.

- Noonan, H. W. (1989). *Personal identity* (2nd ed.). New York: Routledge.
- Olson, E. T. (1999). There is no problem of the self. In S. Gallagher & J. Shear (Eds.), *Models of the self* (pp. 49–61). Thorverton: Imprint Academic.
- Olson, E. T. (2007). *What are we? A study in personal ontology*. Oxford: Oxford University Press.
- Parfit, D. (1984). *Reasons and persons*. New York: Oxford University Press.
- Perner, J., & Ruffman, T. (1994). Episodic memory and autoeic consciousness: developmental evidence and a theory of childhood amnesia. *Journal of Experimental Child Psychology*, 59, 516–548.
- Quinton, A. (1962). The soul. *Journal of Philosophy*, 59, 393–409.
- Rathbone, C. J., Moulin, C. J. A., & Conway, M. A. (2009). Autobiographical memory and amnesia: using conceptual knowledge to ground the self. *Neurocase*, 15, 405–418.
- Reid, T. (1785). *Essays on the intellectual powers of man*. Edinburgh: Bell & Robinson.
- Rosenthal, D. M. (1991). *The nature of mind*. Oxford: Oxford University Press.
- Rubin, D. C. (1996). *Remembering our past: Studies in autobiographical memory*. Cambridge: Cambridge University Press.
- Russell, B. (1912/1999). *The problems of philosophy*. Mineola: Dover.
- Sacks, O. (1985). *The man who mistook his wife for a hat*. New York: Harper Collins.
- Sani, F. (2008). *Self continuity: Individual and collective perspectives*. New York: Psychology Press.
- Schacter, D. L. (1987). Implicit memory: history and current status. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, 13, 501–518.
- Schacter, D. L., & Tulving, E. (Eds.). (1994). *Memory systems 1994*. Cambridge: MIT Press.
- Schechtman, M. (1996). *The constitution of selves*. Ithaca: Cornell University Press.
- Shoemaker, S. (1970). Persons and their past. *American Philosophical Quarterly*, 7, 269–285.
- Shoemaker, D. (2008). Personal identity and ethics. *The Stanford Encyclopedia of Philosophy (Fall 2008 Edition)*. Edward N. Zalta (ed.), <http://plato.stanford.edu/archives/fall2008/entries/identity-ethics/>.
- Shoemaker, S., & Swinburne, R. (1984). *Personal identity*. Oxford: Blackwell.
- Siderits, M. (2003). *Personal identity and Buddhist philosophy*. Hampshire: Ashgate.
- Siderits, M., Thompson, E., & Zahavi, D. (Eds.). (2011). *Self, no self: Perspectives from analytical phenomenological and Indian traditions*. Oxford: Oxford University Press.
- Slors, M. (2001). *The diachronic mind: An essay on personal identity, psychological continuity and the mind-body problem*. Boston: Kluwer Academic.
- Sorabji, R. (2006). *Self: Ancient and modern insights about individuality, life, and death*. Chicago: The University of Chicago Press.
- Squire, L. R. (1987). *Memory and brain*. New York: Oxford University Press.
- Squire, L. R., & Kandel, E. R. (1999). *Memory: From mind to molecules*. New York: Freeman.
- Stawson, G. (2005). *The self?* Oxford: Blackwell.
- Storrington, G. E. (1936). Memory loss by gas poisoning: a man without memory of time. *Archiv für die gesamte Psychologie*, 95, 436–511 (Translated by B. Graham, 2009).
- Strawson, G. (2008). *Real materialism: And other essays*. New York: Oxford University Press.
- Strawson, G. (2009). *Selves: An essay in revisionary metaphysics*. New York: Oxford University Press.
- Strawson, G. (2011a). *Locke on personal identity: Consciousness and concernment*. Princeton: Princeton University Press.
- Strawson, G. (2011b). *The evident connection: Hume on personal identity*. Oxford: Oxford University Press.
- Suddendorf, T., & Corballis, M. C. (1997). Mental time travel and the evolution of the human mind. *Genetic, Social, and General Psychology Monographs*, 123(2), 133–167.
- Tulving, E. (1972). Episodic and semantic memory. In E. Tulving & W. Donaldson (Eds.), *Organization of memory* (pp. 381–403). New York: Academic.
- Tulving, E. (1983). *Elements of episodic memory*. New York: Oxford University Press.
- Tulving, E. (1985). Memory and consciousness. *Canadian Psychology/Psychologie Canadienne*, 26, 1–12.
- Tulving, E. (1993a). What is episodic memory? *Current Directions in Psychological Science*, 2, 67–70.
- Tulving, E. (1993b). Self-knowledge of an amnesic individual is represented abstractly. In T. K. Srull & R. S. Wyer (Eds.), *Advances in social cognition Vol. 5* (pp. 147–156). Hillsdale: Erlbaum.
- Tulving, E. (1995). Organization of memory: Quo vadis? In M. S. Gazzaniga (Ed.), *The cognitive neurosciences* (pp. 839–847). Cambridge: MIT Press.
- Wilson, B. A., & Wearing, D. (1995). Trapped in time: Profound autobiographical memory loss following thalamic stroke. In R. Campbell & M. A. Conway (Eds.), *Broken memories: Case studies in memory impairment* (pp. 31–44). Cambridge: Blackwell.
- Zahavi, D. (2005). *Subjectivity of selfhood: Investigating the first-person perspective*. Cambridge: The MIT Press.