

THE SELF AND ITS BRAIN

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In this paper I argue that much of the confusion and mystery surrounding the concept of Self can be traced to a failure to appreciate the distinction between the self as a collection of diverse neural components that provide us with our beliefs, memories, desires, personality, emotions, etc. (the epistemological self) and the self that is best conceived as subjective, unified awareness, a point of view in the first person (ontological self). While the former can, and indeed has, been extensively studied by researchers of various disciplines in the human sciences, the latter most often has been ignored—treated more as a place holder attached to a particular predicate of interest (e.g., concept, reference, deception, esteem, image, regulation, etc.). These two aspects of the self, I contend, are not reducible—one being an object (the epistemological self) and the other a subject (the ontological self). Until we appreciate the difficulties of applying scientific methods and analysis to what cannot be reduced to an object of inquiry without stripping it of its essential aspect (its status as subject), progress on the Self, taken as a pluralistic construct, will continue to address only one part of the problems we face in understanding this most fundamental aspect of human experience.

The phenomenology is both compelling and universal. We all have the experience of a unitary self, an I that remembers, chooses, thinks, plans, and feels. Yet it has been notoriously difficult to provide an account of just what this thinking, feeling,

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This paper is based on a chapter that appeared in the *Handbook of Self and Identity*, second edition, edited by Mark R. Leary and June Price Tangney (2012). For an additional look at some of the issues raised herein, as well as additional case study material, the reader is referred to that chapter.

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remembering, and planning entity is. Gordon Allport expressed this concern in the following famous quote:

Who is the I that knows the bodily me, who has an image of myself and a sense of identity over time, who knows that I have propiarte strivings? I know all these things, and what is more, I know that I know them. But who is it who has this perspectival grasp?...It is much easier to feel the self than to define the self. (Allport, 1961, p. 128)

WHO AM I?: THE SELF AND THAT TO WHICH IT REFERS

Each of us is intimately familiar with the experience of a unitary self—a first-person perspective, an I that remembers, chooses, thinks plans, feels, experiences, etc. We all have direct acquaintance with a self, the apparent source of the phenomenal unity of our perceptual and introspective experiences (for recent treatments, see Dainton, 2008; Lund, 2005; Strawson, 2009; Zahavi, 1999, 2005). Yet as philosophers repeatedly have shown, it is extremely difficult to provide an account of just what this thinking, feeling, remembering, planning, experiencing entity called the self is (for discussion of some of the difficulties involved, see Eccles, 1994; Evans, 1970; Dainton, 2008; Foster, 1991; Gallagher & Shear, 1999; James, 1890; Jopling, 2000; Klein, 2010; Kolak & Martin, 1991; Krueger, 2011; Lowe, 1996; Lund, 2005; Metzinger, 2009; Mischel, 1977; Olson, 1997, 2007; Parfit, 1984; Perry, 1975; Popper & Eccles, 1981; Rosenberg, 1979/1986; Schechtman, 1996; Shoemaker & Swinburne, 1984; Siderits, Thompson, & Zahavi, 2011; Strawson, 2009; Tallis, 2004; Zahavi, 1999, 2005).

Klein and Gangi (2010; Klein, 2010) have suggested that Bertrand Russell's (1912/1999; 1913/1992; see also Gendlin, 1962) distinction between knowledge by acquaintance and knowledge by description provides a perspective on the source of conflict between our everyday experience of self and our capacity (or lack thereof) to convincingly capture our experience in descriptive, theoretical terms. Russell, in his now classic work, proposed we have knowledge by acquaintance when we know something via direct personal contact (sensory or introspective) and exhibit that knowledge by using appropriately referential terms when we communicate with others. With respect to the self, this is seen in the ease with which we talk about the self as well as understand talk about self by others.

However, when we attempt to make explicit what it is we refer to by the word — when asked to describe what the word Self means—problems quickly arise (Similar concerns have been voiced by philosophers of varied theoretical commitments—e.g., Earle, Kant, Kierkegaard, Sartre, Hume, Husserl, Strawson, van Fraassen, van Inwagen, Zahavi). Despite centuries devoted to the task, it has proven notoriously difficult to provide a set of propositions capable of transforming our acquired knowledge into a satisfying description of what a self is.

How, for example, can one explain experienced identity of the self over time—i.e., the diachronic self? John Locke (1690/1731) argued that a continuity of conscious thought (what we now would call episodic memory¹) might do the trick, but issues soon raised by Thomas Reid and other philosophers called attention to serious problems with Locke's criterion (for review and discussion, see Dainton, 2008; Klein & Nichols, in press; Noonan, 1989; Parfit, 1984; Perry, 1975; Shoemaker & Swinburne, 1984; Strawson, 2011a).

Equally vexing problems arise when we attempt to explain the perceived phenomenological unity of the self at a single moment in time—the synchronic self. Specifically, how do we account for the ways in which a diversity of images (visual, acoustic, tactile, etc.), sensations and thoughts appear to merge into a single, unified experience of self-awareness (the so called "binding" problem of conscious awareness; e.g., Dainton, 2008; Damasio, 1999; Lowe, 1996; Lund, 2005; Metzinger, 2009; Tye, 2003; White, 1991)?

These, and a host of equally contentious ontological issues involving the word Self (e.g., consciousness, subjectivity, self-awareness, free will, explanatory gap, mind/body, subject/object, personal continuity, etc.) make clear that describing what we are talking about when we use the word Self is a task for which insufficient progress has been made (for reviews, see Baillie, 1993; Chalmers, 1996; Dainton, 2008; Giles, 1997; Johnstone, 1970; Klein, 2010; Klein & Gangi, 2010; Lund, 2005; Madell, 1984; Metzinger, 2009; Shoemaker & Swinburne, 1984; Siderits et al., 2011; Strawson, 2005; Vierkant, 2003; Williams, 1973; Zahavi, 2011; for an excellent historical review of problems arising in the use of the term Self, see Sorabji, 2006).

While this would seem a cause for great concern among psychologists—William James (1890) argued, the self is the fundamental unit of analysis for a science of mental life, the problem about which everything else revolves (e.g., James, 1890, p. 221)—such concern is not readily apparent from perusal of articles in contemporary (nonanalytic) psychological literatures (e.g., social, cognitive, developmental, neuropsychological, brain imaging). Compounding the oversight, the number of research papers exploring self-related processes in the above mentioned fields has been proliferating at a staggering pace.

THE RECENT PROLIFERATION OF SELF RESEARCH: AN ACCUMULATION OF EMPIRICISM IN SEARCH OF A CLEAR REFERENT

Gergen (1971) commenting on the explosion of articles on the self appearing in the 20 years since hard-line positivism's informal ban on black-box psychology (e.g.,

1. There is some dispute about exactly what Locke had in mind here, but the passage, which goes as follows—"as far as this consciousness can be extended backwards to any past action or thought, so far reaches the identity of that person" (1690/1731, II, xxvii, 9)—usually is taken to involve a person remembering the past action or thought (see, e.g., Shoemaker, 2008). 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 . On this account, Locke's view maps comfortably onto what now is termed episodic memory (e.g., Klein & Nichols, in press). It is important to keep in mind, however, that not all philosophers follow the majority on these points (personal communication from Galen Strawson, March 5, 2011). These issues will be more fully discussed in the section of this paper titled "The Ontological Self and the Problem of Diachronic Personal Identity."

the behaviorist movement in American psychology) gradually had given way to traditional appreciation of the importance of inferring mental structures from the behavior of the person (e.g., Gardner, 1985; Klein & Kihlstrom, 1998; Niesser, 1967), recorded an astonishing 2,000 studies published on the self during the previous two decades. Approximately 25 years later, John Kihlstrom and colleagues (Kihlstrom et al., 1988) identified dozens of hot research areas in which Self served as prefix (thus occupying the central position with regard to the topics addressed): e.g., self-awareness, self-concept, self-control, self-verification, self-perception, self-handicapping, self-regulation, self-schema, self-image, and self-stereotypes. Most recently, Klein & Gangi (2010), surveying the table of contents of the (then) most recent issue of the journal *Self and Identity* and identified an equally rich collection of self-hyphenated research areas (a large number of which were carry-overs from those identified 22 years earlier by Kihlstrom and colleagues).

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, handicapped? Although this question has led to a variety of psychological models of self, dating back more than 100 years (e.g., Calkins, 1915; Conway, 2005; Gallagher & Shear, 1999; Greenwald, 1981; Harter, 1999; James, 1890; Kihlstrom et al., 1988; Kihlstrom & Klein, 1994, 1997; McConnell, 2011; Neisser, 1988; Samsonovich & Nadel, 2005; Stern, 1985; Stuss, 1991), it has proven extremely difficult to find a coherent and convincing descriptive account of the self, per se. Rather, these works largely describe the neurological and cognitive mechanisms that appear causally responsible for the knowledge available to the self of subjective experience.

THE SELF AND CAUSALITY

A number of researchers have complained that the self of subjective experience (what I will be calling the ontological aspect of self—see below) cannot exist; or if it exists, it does so as an illusion or an epiphenomenon. This is because a nonmaterial self can have no causal relations with the material-objective world of neurons (e.g., the principle of causal closure under the physical; for reviews, see Collins, 2008; Hasker, 1999; Metzinger, 2009; for an overview of Eastern philosophical issues on this topic, see Loy, 1988). However, this prejudges the problem by assuming the terms of causal relation (i.e., the ontological self and the material person) are sufficiently well established to ascertain the logical coherence of any causal interaction (e.g., Hering, 1913; Kasabova, 2009).

Specifically, to be in a causal relation, the cause must be adequate to its effect (e.g., Earle, 1955; Martin, 2008). Hence, if the self of everyday experience is the effect of underlying neuro-psychological processes, we must be able to say what the effect is. But since the cause has yet to receive adequate description in psychological or philosophical terms (see above), how can we know whether the systems posited to underlie it are sufficient to the task of inferring causality? Or, to avoid prejudging the direction of the proposed causal relation, how can we establish that the self, which remains a descriptively vague designation (i.e., little more than a slot holder in a hypothesized relation, see above) is sufficient to serve as the causal agent for any hypothesized effect (e.g., effects such as self-knowledge, memory, feelings, agency, ownership, etc.).

Put simply, the description of an effect, due to necessity, is prior to any investigation of its cause(s), because the cause must be precisely of that effect. But, while we can discuss, experiment with, and learn about the neural scaffolding presumed to support the self of first person subjectivity, we have, to date, no clear idea of what it is, in an ontologically meaningful sense, those causes eventuate in (e.g., the phenomenological unity of subjective experience).

We can of course (and typically do) attach a proper name to our acquaintance with our personal subjectivity (i.e., the self), or attempt a description by analogy (i.e., the self is like a neural network in which the superordinate node represents...). But to characterize the self via analogy, in turn, raises the question of the extent to which the analogy holds. And for that, we must turn to additional analogies which can point out possible limitations of the first. But this only serves to reintroduce the same problem for the second, *ad infinitum*.

In sum, the self of experience is too poorly understood to bear the definitional adequacy required of the terms of a causal relation. Not surprisingly, many researchers (intentionally or otherwise) sidestep this difficulty, relying on their readers' familiarity with the term Self (i.e., the self of subjective experience), derived from years of knowledge by acquaintance, to confer a sense of confidence that he or she knows to what it is the author refers. But the basic problem remains—we do not know what it is we are talking about when we apply the label Self (nor, as argued below, is the term open to being grasped and thus labeled via scientific objectification). This is a serious problem.

WHAT AM I?: THE SELF AND ITS NEURAL SYSTEMS OF KNOWLEDGE

The complexity of questions posed by the problem of the ontology of self (i.e., what a self is) has led some to wonder whether a conceptual understanding of self is possible in practice (e.g., Olson, 1999; Uttal, 2001; Vierkant, 2003) or even in principle (e.g., McGinn, 1991; Metzinger, 2009; Uttal, 2009). While I take no firm stand on this dispiriting appraisal, if pressed, I admit to sharing many of these authors' doubts.

In this section I turn my attention to what can be asserted with reasonable confidence about the self. Specifically, I discuss what I call the *epistemological self*—the behavioral, affective, cognitive, and neural systems assumed to be responsible (at least in part) for providing the ontological self with knowledge of whom and what it is (for reviews, see Klein, 2004, 2010; Klein & Gangi, 2010; Strawson, 2009). I then point out an apparent incompatibility between treating the self as both the subject of experience (i.e., an object) and the agent of experience (i.e., a subject) (for more detailed treatment, see Earle, 1972; Krueger, 2011; Strawson, 2009; Zahavi, 1999, 2005).

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 Crispin, Smith, & Macdonald, 1998; Earle, 1955; Gennaro, 1996; Klein, 2004; Rosenthal, 1986, 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, 2012a; Klein & Gangi, 2010).

In particular, considerable progress has been made on the cognitive and neurological bases of the epistemological self (e.g., Conway, 2005; Kihlstrom & Klein, 1994, 1997; Klein, Cosmides, Tooby, & Chance, 2002; Klein & Gangi, 2010; Klein & Lax, 2010; McConnell, 2011; Neisser, 1988; Samsonovich & Nadel, 2005; Sedikides & Spencer, 2007). This is because, unlike ontological questions, the epistemological self—i.e., neurological bases of self-knowledge—are empirically testable, and thus amenable to scientific analysis. Not surprisingly, scientific exploration of brain systems underlying knowledge of whom and what we are constitute the overwhelming majority of the thousands of papers that have been published on the self since Gergen's (1971) literature review (for recent reviews of this literature, see Leary & Tangney, 2003; Sedikides & Brewer, 2001; Sedikides & Spencer, 2007). The most up-to-date summaries of these findings constitute the primary content of the papers found in the present special issue of *Social Cognition*.

To summarize, in this paper I draw a sharp distinction between two aspects of self, aspects whose special properties merit considerable attention for how we conduct research and theorize about the self. Those aspects are:

1. The Ontological Self—the self as experienced as single, subjective, and mentally propertied (e.g., Strawson, 2009). Its character as self-experience means it entails subjectivity, which, in turn, implies that does it not allow for treatment as an object of analysis (see below; also see Earle, 1972; Strawson, 2009; van Fraassen, 2005; Zahavi, 1999, 2005). That is, it is not clearly or easily reducible to neural function, although it likely is informed (in some manner; for a possible explanation, see the section “So, what is the ontological self?” below) and, perhaps, informing (in some manner) of the experience(s) of self (for discussion, see Hasker, 1999). Finally, the ontological self always is (a) occurrent—that is, an ever present (save, perhaps, for episodes of dreamless sleep or vegetative coma), conscious condition of the psycho-physical person—and (b) invariant (e.g., Siderist et al., 2011), despite the objects of its awareness being subject to considerable variation. These latter two features will be found to play a central role when I examine the relation of the ontological self and its relation to time (see the section “When am I?: The Ontological Self and Time” below).
2. The Epistemological Self—the assumed psycho-physical (largely neurological) bases of self experiences. The epistemological self is propertied by features and processes of the various systems of our material bodies. These systems in some way or ways provide the raw data (as well as highly processed data) for self-experience—that is, they provide content for the ontological self. In contrast to the ontological self, the epistemological self can be either occurrent, or it can exist as a dispositional state with the possibility of becoming occurrent (i.e., when it serves as an object of subjectivity). It also differs from the ontological self with respect to invariance; unlike the ontological self, the content of the epistemological self is constantly in flux (*vis a vis* experience), although some aspects (e.g., long term memory, body image) show varying degrees of stability as well. From a materialist (or emergent materialist; e.g., Bunge, 2010) stance, the epistemological self is amenable to scientific study and constitutes the major body of empiricism psychologists rely on when discussing and researching what they term The Self.

It might strike the reader that my use of the terms epistemological and ontological in reference to the self are a bit unclear. Such concern is warranted particularly with regard to the epistemological self. After all, in philosophy, epistemology typically refers to the process of acquisition of knowledge. In this light, it might appear that such a term is better reserved for what I am labeling the ontological self.

However, I have chosen to use the term epistemological self as a 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 experienter,” “the self of science and the self of experience,” etc. (Note: While psychologists typically trace such distinctions back to James, 1890, examination of the literature shows these ways of dividing up the conceptual pie predate James by at least one thousand years; Sorbaji, 2006).

In sum, my stance is this: Ultimately we will not make progress coming to terms with our object of inquiry—The Self—until we acknowledge (in, perhaps, Jamesian fashion) that the self is a *multiplicity*, both as pertains to the two intimately related, yet metaphysically separable aspects of the term Self (i.e., ontological vs. epistemological), as well as within each of these two self aspects. The claim of componential plurality holds strongly for the epistemological self (for recent review, see Klein & Gangi, 2010; Klein & Lax, 2010). Whether it holds for the ontological self as well is subject of considerable debate (e.g., Dainton, 2008; Krueger, 2011; Lund, 2005; Strawson, 2009). But, the take-away message is this: Until we not only recognize, but fully embrace the different types of selves we routinely conjoin in both our thought and research (for review, see Strawson, 2009), progress on what Chalmers (1996) has described as the hard problem likely will remain elusive.

TYPES OF EPISTEMOLOGICAL SELF-KNOWLEDGE

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 constituted from, a multiplicity of neural sources (i.e., the epistemological self; for extensive reviews, Klein, 2010; Klein & Gangi, 2010; Klein & Lax, 2010), yet we experience the self as a phenomenological unity (e.g., Earle, 1972; Lund, 2005; White, 1991).

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, 2010; Klein & Lax, 2010; Neisser, 1988; Stern, 1985). These include, but are not limited to:

1. Episodic memories of one’s life events (Klein, 2001; Klein, Loftus, & Kihlstrom, 1996; Klein, Rozendal, & Cosmides, 2002; Stuss & Guzman, 1988; Young & Saver, 2001).
2. Semantic summary representations of one’s personality traits (e.g., Klein, Cosmides, & Costabile, 2003; Klein, Loftus, Trafton, & Fuhrman, 1992; Tulving, 1993).

3. Semantic knowledge of facts about one's life (e.g., Hurley, Maguire, & Vargha-Khadem, 2011; Klein, Rozendal, & Cosmides, 2002; Tulving, 1993; Young & Saver, 2001).
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 (e.g., Dalla Barba, 2002; Klein, Loftus, & Kihlstrom, 2002; Tulving, 1985), although semantic memory makes a contribution as well (e.g., Klein, Loftus, & Kihlstrom, 2002; Hurley, Maguire, & Vargha-Khadem, 2011).
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 (e.g., Frith, 1992; Gallagher, 2000; Klein & Nichols, in press; Lysaker & Lysaker, 2008; Oshana, 2010; Stephens & Graham 2000).
6. The ability to self-reflect: To form metarepresentations where the agent is the self, and make inferences on the basis of those representations (e.g., Frith, 1992; Katzko, 2003; Klein, German, Cosmides, & Gabriel, 2004; Robinson & Freeman, 1954).
7. The physical self: The ability to represent and recognize (e.g., in mirrors, photographs) one's body (e.g., Gallagher & Cole, 1995; Gillihan & Farah, 2005; Hehman, German, & Klein, 2005; Keenan, 2003; Klein, 2010).
8. The emotional self: The ability to experience and produce emotional states (both transient and occurrent) that provide value, affective valence and evaluative direction to our actions and reasoning (e.g., Damasio, 1994, 1999; Mills, 1998; Singer & Salovey, 1993).²

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 work together to help create our sense of self as a subjective unity (e.g., Damasio, 1999; White, 1991), 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, it has been shown that sources of self-knowledge can be lost or partially impaired without a corresponding loss in one's ability to experience the self as a singular, subjective point of view. Indeed, the archives of neurology are filled with cases of individuals who lack access (in varying degrees) to self-constituting knowledge-bases (particularly sources 1–3 in the above list) yet maintain a sense of personal identity and subjective unity (for reviews and relevant data, see Cad-

2. While I have not included the environment (social, cultural, and physical) and its (reciprocal) influence on the person, this is not to dismiss its obvious relevance for what it means to have knowledge of one's self. For example, what I am calling the epistemological self (and the autobiographical memory component in particular; e.g., Bruner, 2002; Eakin, 2008; McAdams, 1993; Nelson, 2003) is substantially socio/cultural both in its nature and expression (for review, see Fivush & Haden, 2003; see also the Symbolic Interactionist positions of Mead, Cooley, and many others, such as James, 1890, on the social self).

However, I have chosen to stake my claims about the constituents of the epistemological self primarily at the level of neural architecture. Accordingly, social, cultural and situational self-knowledge is folded into, and thus contained within, the neural machinery provided by systems of memory. This may be a vast oversimplification (as is suggested by consideration of mirror neurons, Theory of Mind processes, and other neural structures that appear unique to social cognition rather than cognition taken more generally; e.g., Klein, 2012). I acknowledge that my selection criteria may be overly restrictive, but restrictions of space make incorporation of social/cultural considerations treatment prohibitive.

dell & Clare, 2010; Eakin, 2008; Feinberg, 2001, 2009; Kircher & David, 2003; Klein, 2001, 2004, 2010; Klein & Gangi, 2010; Rathbone, Moulin, & Conway, 2009).

THE (PARTIAL) INDEPENDENCE OF THE EPISTEMOLOGICAL AND ONTOLOGICAL ASPECTS OF SELF

This is not to say that damage to sources of self-knowledge is free of repercussions for one's experience of self: The ontological self necessarily is affected by a loss of content from its epistemological bases (for discussion, see Oshana, 2010). Patients may forget personal facts and beliefs—for example, where and when they were born (e.g., Klein, Rozendal, & Cosmides, 2002; Klein, Cosmides, & Costable, 2003), episodic self-narratives (Klein, 2001; Klein, Loftus, & Kihlstrom, 1996; Rathbone et al., 2009; Tulving, 1993; Young & Saver, 2001), details of their physical appearance (e.g., Caddell & Clare, 2010; Hehman et al., 2005), the belief that the thoughts they experience belong to them (e.g., Frith, 1992; Lyaker & Lysaker, 2008, for review, see David & Cutting, 1994), and the inability to imagine themselves in the future (e.g., Ingvar, 1985; Klein, Loftus, & Kihlstrom, 2002; Tulving, 1985). But, their experience of subjectivity remains unitary and intact.

SOME EXAMPLES

Depending on the neural damage incurred, varying degrees of confusion about one's self will be suffered (e.g., Klein, 2001). For example, my colleagues and I (Hehman et al., 2005) recently examined an elderly woman in later stages of Alzheimer's Dementia. Her score on the Mini Mental State Exam (MMSE; a cognitive assessment procedure for the severity of dementia; Cockrell & Folstein, 1988) was less than 10 (the norm for her age group is approximately 27 on a 30-point scale). She was unable to recognize pictures of her taken following the onset of her disease. She also experienced a variety of memory problems typically associated with late stages of dementia (e.g., loss of personal recollections, difficulties in object naming, word finding difficulties, temporal disorientation, etc.).

Interviewing revealed, however, that she maintained a sense of herself as a conscious entity, albeit one beset by confusion. She was worried, fearful, neglectful, and had difficulty identifying objects in her environment. Moreover, she was troubled by these holes in her mental life. But her subjective sense of her self as a living, experiencing entity, was intact: Her subjective point of view—what I am calling the ontological self—did not collapse as a result of her cognitive deficits. While she lost access to a variety of self-relevant sources of knowledge, this was not accompanied by a phenomenological dissolution. Rather, she behaved exactly how one would expect a conscious, subjective entity to react to the cognitive chaos engendered by the severity of the disease process (for additional discussion and case studies, see Klein, 2012a; Mills, 1998).

A similar obstruction of the epistemological self in the presence of preserved subjective unity is presented by the case of Patient D.B. (e.g., Klein, Rozendal, & Cosmides, 2002), 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, 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 ($r = .69$ across sessions) and consistent with the way he is perceived by others ($r = .64$ between D.B. and his daughter). (Age-matched controls showed r s = $.74$ and $.57$ across sessions and raters, respectively). 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. thus 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 knowledge? Further testing of D.B. suggest that it can. D.B.'s semantic memory was also affected by his illness, although this impairment was less severe than that affecting his episodic memory (Klein, Rozendal, & Cosmides, 2002).

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 more general semantic knowledge, his knowledge of his own personality was intact. These findings suggest a dissociation within semantic memory: between general semantic knowledge (and knowledge of personal facts) and semantic knowledge of one's own personality traits (for review, see Klein, 2010).

Additional testing revealed dissociation between D.B.'s knowledge of his own personality traits and the traits of others. D.B. could not retrieve accurate knowledge of his daughter's personality traits: The correlation between D.B.'s ratings of his daughter and her self-ratings was not reliable ($r = .23$), and was less than half that found between control parents' ratings of their child and the child's self-ratings ($r = .61$). Thus, although D.B.'s ability to retrieve accurate knowledge of his own dispositions was intact—no different from that of age-matched controls—he had lost the ability to retrieve accurate personality information about his adult daughter, with whom he lives.

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 & 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 raises the possibility that the human cognitive architecture includes a subsystem of semantic

memory that is functionally specialized for the storage and retrieval of trait self-knowledge).

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 amnesia, D.B.'s concern over lapses of self-knowledge never lasted long. If his attention was diverted for a few moments from the ontological self's concerns, he lost track of the vacancies in self-knowledge and could be easily induced to redirect his focus on new, less troubling, thoughts or objects.

Thus, aspects of self-knowledge can be seriously impaired both in cases of dementia and dense amnesia (for additional evidence, see Klein, 2010, 2012a). Yet, the patients' sense of themselves as a singular source of first-person identity remained, to the best of our knowledge, intact. As a result of breakdowns in access to varied sources of self-knowledge, the ontological self become increasingly confused and frightened. But, and this is the important point, the ontological self remains intact as the center of subjectivity. Based on behavioral observations (both verbal and physical), these individuals (and others like them; see Klein, 2012a) remained capable of experiencing and voicing the confusion they experienced, remained capable of wondering what has happened to them, and, sadly remained capable of fearing their fate. In the final stages of dementia, the ontological self may simply surrender to the chaos wrought by neural degeneration and exist in a state of bewilderment. But, the ontological self remains; it remains as a subjective center of conscious unity, albeit the subject of the confusion, the bewilderment, the despair, the eventual giving-up brought on by the gradual dissolution of the epistemological self.

Similar observations and arguments can be made about those suffering schizophrenia (for relevant data, see Lyaker & Lysaker, 2008; Sass & Parnas, 2001) and dissociative identity disorders (DID; e.g., Braude, 1995; Dorahy, 2001). Indeed, in regard to the latter, Braude, after conducting an extensive historical survey and detailed psychological and philosophical analysis of DID, was led to conclude that there must be a single, unifying, subjectivity underlying the multiplicity of distinct personalities exhibited in cases of Multiple Personality Disorder. As he noted, it is hard to understand how one could experience a conflict (i.e., between one's multiples) absent "a single synchronically and diachronically synthesizing self for whom it is a conflict" (Braude, 1995, p. 179; for an extended discussion, see Strawson, 2009, pp. 72–92 on the experience of self as a subjective singularity).

An extreme illustration of these points is 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 such as the analysis, synthesis, and organization of complex associations (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.

Zasetsky'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, Zasetsky 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 (summarized in Jopling, 2000). 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, Loftus, & Kihlstrom, 2002; Tulving, 1985). He also professed to have no clear idea of his preferences, beliefs, values, or goals.

Eventually, under the extraordinarily patient tutelage of Luria and others, Zasetsky 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 Zasetsky'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 the ability to imagine his future or to look back on his past. 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 Zasetsky 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.

THE EPISTEMOLOGICAL SELF ABSENT THE ONTOLOGICAL SELF

The subheading of this section is best taken as a question rather than an assertion. My conclusion will be that the epistemological self absent the ontological self, while a logical possibility, is yet to be demonstrated in an empirically or theoretically convincing manner.

Consider, for example, one particularly strong candidate for separation of the epistemological aspect of selfhood from its ontological aspect—the mental affliction known as depersonalization (e.g., Sierra & Berrios, 1997). In such cases, patients show a persistent or recurrent sense of being detached from their bodies, a lack of personal ownership of the psycho-physical Me, a feeling that one's body does not belong to the self, e.g., DSM IV Manual (American Psychiatric Associa-

tion, 2004). In such instances it might appear that a fully functioning psycho-physical entity exists in conjunction with a partially or fully compromised sense of personal subjectivity (i.e., the I of personal subjectivity no longer exists).

However, while episodes of depersonalization clearly entail a lack of personal ownership toward what should be one's personal experience, they do not provide license for concluding an absence of subjectivity on the part of the suffering patient. As Albahari (2006, pp. 173–174) observes, depersonalized patients "... realize there is something wrong and they *wish the state and its attendant sensation would go away* (italics in original). This 'wishing the state would go away' is a clear instance of investment or what Buddhism would refer to as *tanha* [i.e., personal attachment]. The negative emotions arise because the person is in a situation he wishes was otherwise." The depersonalized individual thus submits to analysis of ontological selfhood that is strongly reminiscent of my observations about the presence of ontological selfhood in cases such as late-stage Alzheimer's Dementia and severe amnesia (see above).

Albahari (2006, 2011) does contend, however, that cases of epileptic automatism (for review and discussion, see Damasio, 1999) may be suitable candidates for the epistemological self in the absence of ontological self-reflection. Specifically, persons afflicted with epilepsy may undergo episodes of transient automatism such that the person is able to function behaviorally at a normal, or near-normal, level despite giving the appearance of complete absence of personal ownership of his or her acts. In short, the person behaves appropriately, but appears to have no realization that any aspect of his or her behavior is owned. Experience, under such circumstances, appears to lack a subjective sense of Me as author of the behaviors performed. Such patients, however, typically are (at least minimally) responsive to their environment, thereby giving the appearance that "awareness is present"; Albahari, 2006, p. 177). Accordingly, Albahari (2011) argues such individuals constitute essentially existence proofs that awareness can exist in the psycho-physical person despite an apparent absence of personal subjectivity: That is, in my terminology, the epistemological self exists absent the ontological self.

I do not think this interpretation of epileptic automatism will stand. First, as Albahari (2006, p. 142) herself maintains "the term *awareness* will henceforth be used ... to denote a witness-consciousness with an *intrinsic phenomenal character*, a subjective character of its own that brings it to conscious experience [all italics in original]." Apparently, Albahari argues for awareness sans subjectivity (which is, by definition, personal), while simultaneously defining her argument out of existence.

Second, Albahari's interpretation of automatism pivots precariously on the notion that environmentally appropriate behavior on the part of an (any) organism requires some form of awareness (which, by her definition, is defined *as* subjectivity; see above). Since automatism is considered an example of appropriate responding absent personal subjectivity, awareness is taken to have come apart from subjective experience. In this regard, I believe Albahari has made an error of interpretation.

Much of normal human behavior consists in appropriate action and reaction absent conscious/subjective experience (for an excellent review, see Milner & Goodale, 1995). Specifically, as is well-known from the study of both normal and pathological human behavior (e.g., Weiskrantz, 1997), there are different neural routes supporting actions that appear well-adapted to environmental contingen-

cies: Some behaviors require conscious participation while others (perhaps the vast majority!) do not. To argue that automatic behavior seen in certain states of epilepsy is evidence for awareness absent personal subjectivity is thus to conflate the presence of appropriate action at the behavioral level with the empirically-contested assumption that well-formed action requires (and thus provides evidence of) subjectivity/consciousness. While such cases may yet be found (clearly, an absence of evidence is not evidence of absence), I have yet to see a convincing demonstration or argument that the epistemological self exists (in intact or degraded form) absent interaction with the ontological self.³

THE ONTOLOGICAL SELF ABSENT THE EPISTEMOLOGICAL SELF

The situation changes dramatically, however, when the question is turned on its head—i.e., can the ontological self exist absent the epistemological self? A provocative example of a situation in which the ontological self persists in the absence of epistemological bases of self-knowledge is provided by a case study reported by Shewmon, Holmes, & Byrne (1999). They studied four individuals between 5 and 17 years old who were born with near total loss of cerebral cortical functioning. For such persons, the brain supports life at a subcortical level (e.g., brain stem), but higher mental functions (e.g., those supporting the epistemological self) are unavailable to the ontological self.

So, under these conditions of neurological impairment, what do they find? The answer is exactly what one might expect if there is a distinction to be drawn between the two forms of the self I have proposed. These children show a continuity of consciousness/subjectivity despite lacking the neural machinery to express this awareness verbally. They orient toward familiar people and away from unfamiliar, smile and track persons of importance in their lives, discriminate visually (albeit via subcortical visual mechanisms), and respond appropriately to pain and pleasure at both a general and more specific (e.g., music appreciation) level. They also discriminate between environments, show, via appropriate facial expressions, preferences and dislikes (e.g., for music, people, etc.), show awareness of their own bodies, appear to enjoy socializing (e.g., being with people and even are capable of limited interaction) and provide clear behavioral evidence indicating to their caretakers when they are conscious and unconscious.

In short, their behavior does not resemble that of patients for whom the prognosis of permanent vegetative state can be meaningfully applied. They show awareness of both the physical world and their own bodies and they communicate this awareness via their physical acts and facial expression (for a related view, see Owen et al., 2006).

So, what does this tell us? A number of possibilities can accommodate the data. One is that the ontological self (which I associate with a level of conscious experience that entails self-awareness; e.g., Lund, 2005) can be supported by subcortical

3. Save, perhaps for cases of dreamless sleep, vegetative coma, or persons no longer alive! These conditions do not permit strong conclusions with regard to the status of either the ontological or epistemological self. Cases of dreamless sleep and vegetative coma are experientially opaque (as suggested by both occurrent and retrospective reports), and given the well-documented but highly contentious reports of near-death experience (for review see Kelley et al., 2007), the jury still is out on the case of death.

neural machinery—i.e., that there exists psychoneural identity between neuron and ontological self that is preserved and mediated by activity from evolutionary primitive neural areas, such as the brain-stem. Although its instantiation may be limited in the absence of higher cortical mechanisms, there is a sufficient neural basis in decorticate individuals to support at least a form of the ontological self.

Another possibility is that the ontological self is an emergent property (e.g., Clayton, 2004) of subcortical mechanisms. That is, rather than being identical with subcortical neurology, the ontological self is a property made possible by, but not reducible to, neural mechanisms spared by developmental conditions that render neocortical function impossible.

TRANSMISSION THEORY

Another possibility, and one I endorse, is that the brain does not create the ontological self; rather it enables its expression. In this respect, I share the view of those who endorse various forms of transmission or filter theories of consciousness (e.g., Almog, 2002; Eccles, 1994; Fechner, 1836/1943; James, 1909/1996; for extensive review, see Kelley et al., 2007) which assumes that our neural apparatus has evolved to a sufficient level of complexity to: (a) underwrite the epistemological self, and (b) provide an environment sufficiently complex to enable expression of the ontological aspect of self, an entity not necessarily housed within, or confined to, any particular biological mechanism. It is important to note that this orientation toward the interaction of consciousness and psycho-physical entities stands opposed to the oft-stated belief that consciousness comes in a variety of levels (e.g., Damasio, 1999). Rather, it is the complexity and architectural sophistication of its neural host that determines the level at which consciousness (as a singular entity) can be expressed by an organism—ranging from sentience to self-reflective awareness.

While such speculation likely will strike the reader as far fetched, it is worth noting that these ideas are not uniquely associated with Descartes' substance dualism and his highly debatable contention that mind and body comingle in the pineal gland. For example, some versions of quantum physics (particularly of the Copenhagen variety; e.g., Bohr, Von Neumann; for accessible reviews, see Marganau, 1984; Stapp, 1993, 2011) have found a need to introduce a similar idea into their theoretical framework—that is, to bring in consciousness (i.e., the observer) as a separate, yet related, component of their formalization of quantum mechanical reality.

On a related note, much of Eastern Wisdom Traditions is based on the idea that the ultimate foundation of reality/being consists in pure, content-free consciousness (for excellent reviews of this tradition and its implications for the self, see Loy, 1988; Siderits et al., 2011). The explicit mechanism(s) by which consciousness, in its pure manifestation, interacts with the transient (and possibly illusory) psycho-physical aspect of one's earthly being is left largely unspecified; yet several versions of Eastern philosophic views of consciousness can be interpreted as entailing the distinctly non-“Western materialist/pre-quantum mechanistic” outlook that the human sense of self/consciousness is received, in some manner, by the organ of thought (i.e., the brain), which, in turn, enables consciousness to interact with

our psycho-physical manifestations as we pass through a series of psycho-physical, earthly births, and rebirths (i.e., *samsana*).

SO, WHAT IS THE ONTOLOGICAL SELF? CONSCIOUSNESS AND THE PSYCHO-PHYSICAL ASPECTS OF PERSONHOOD

We all experience aspects of reality (not, of course, in its full complexity!) via our sensory organs. We know of five such organ systems, and we are limited to those aspects of reality they are able to apprehend and represent (we can, of course, conceive of a reality beyond our sensory limitations via such mental feats as induction, inference, and imagination, etc.).

According to some Eastern traditions, however, the corporeal aspect of human existence also possesses another sensory-like capacity that accepts consciousness as its entity of discernment (referred to as the *vijnana skandha*; for recent discussion see Alhambri, 2006; Siderits et al., 2011). This *skandha* enables its possessor to have contact with consciousness, which, in most Eastern traditions is not simply a constituent of reality (e.g., Descartes' substance dualism), but ultimately is reality. A similar position on the independent, non-material reality consciousness can be found in Western philosophy, beginning with Parmenides around 450 BC and continuing to the present.

A potential implication of this view is that consciousness interacts with our earthly incarnation via the *skandha* of *vijnana*, both informing and being informed by—and ultimately, according to Eastern tradition, at one with—our psycho-physical earth-bound manifestations (e.g., the epistemological self). On this view, consciousness is both enabled by sufficiently sophisticated brains (such as those possessed by humans. This is not to deny subjectivity to nonhuman species; rather, it is to suggest that a certain level of neural complexity is required for the construction of the human ontological self) as well as providing its host the gift of self-reflexive subjectivity (i.e., the ontological self). It is the source of human ontological self, enabling us to transcend our purely psycho-physical endowments and limitations (both mental and physical), and reflect on objects that present themselves to, or transpire within, our mind.

On this view, the relation between consciousness, the ontological self and its neural realization effectively is turned on its head: Rather than the ontological self being causally dependent on brain activity, our first person subjectivity (i.e., consciousness), as the physicist Henry Margenau (1984, p. 97) nicely puts it, is regarded "...as a field in the accepted physical sense of the term, but it is a non-material field, its closest analogue is perhaps a probability field...which mind interacts with the brain." He continues, "...mind is not an effluvium of the body or an epiphenomenon coming into play at a certain stage of organization of matter" (Margenau, 1984, p. 93), continuing that "...the brain and mind form a dualism similar to the wave-particle dualism in modern physics" (Margenau, 1984, p. 45; for a different, yet related, view on the nonmaterialist nature of consciousness, see Bohm, 1980).

These quotes, in combination with the Eastern notion of *vijnana skandha*, suggest that the relation between the ontological self and its brain may be profitably viewed as a form of perception which, like other acts of perception, helps shape

our mental landscape. However, unlike our better-understood perceptual capabilities (e.g., vision, touch), our ability to make contact with the conscious aspect of reality enables the brain, in a manner not yet appreciated, to become subjectively aware of the content of its representations (i.e., its objects). In this sense, consciousness can be thought of as a perceiving perception—i.e., a perceived aspect of reality that can reflect on its ability to become attached to its psycho-physical host. In this way consciousness as perceived is an actively embodied rather than passively apprehended.

However, the subject of this perceptual-like act—i.e., consciousness—is not, itself, present to itself. Rather, it remains transparent (as per Buddhist analogy of the light that does not illuminate itself; for discussions, see Albahari, 2006; Siderits, 2003). As the philosopher Roderick Chisholm notes “...one is never aware of oneself...although we may apprehend things that are *pour-soi*, things that are manifested or presented to the self, we cannot the self to which, or to whom, they are manifested—we cannot apprehend the self as it is in itself, as it is *en-soi*...And Russell has frequently said the self or subject is not ‘empirically discoverable’” (Chisholm, 1969, p. 7). In short, our subjectivity (as will be argued more extensively in the section “The Two Selves: The Objective Self of Science and the Subjective Self of Personal Awareness” below) is able to perceive itself only subsequently as object, not occurrently as a subject (for a recent, well-reasoned attack on this contention, however, see Strawson, 2011b).

The suggestions on offer certainly do not solve what Chalmers (1996) has termed the hard problem—i.e., “the feeling of what it is like” aspect of subjectivity (e.g., Nagel, 1974). Many issues need far better specification and must be worked out in much greater detail (e.g., where in the brain conscious perception takes place; the causal closure of the physical world; the manner in which the conscious perception enables subjective awareness in a psycho-physical host of sufficient neural complexity) before the above ideas could be considered even modestly theoretically viable. The perspective on display serves mostly as a guide to and suggestion for a potential change in how we view consciousness (and, by implication, its interaction within persons via the ontological self).

It is no exaggeration to suggest that the vast majority of the scientific and philosophical community regard consciousness as a property (emergent or otherwise) of neural (and perhaps, ultimately, quantum) activity. In its status as a constituent, it thus is subject to reductive analysis. Accordingly we find an abundance of scientific and philosophical reductive orientations toward the topic of consciousness (e.g., psycho-neural identity theory). These positions, however, have no more warrant *vis a vis* empirical findings than does the position I am proposing.

To date, there exists no viable or even partially convincing explanation of how non-conscious organic matter gives rise to subjective experience (e.g., qualia, that is, raw feels). While my proposal may be equally unsatisfying (but, for different reasons), it does serve as a way to broach some of the logical difficulties entailed by assuming subjectivity can spring, *ex nihilo*, from organic matter, provided that matter is suitably arranged (in a yet-to-be specified manner). By contrast, an argument for subjectivity, based on the presumption that subjectivity/consciousness is a component (perhaps, according to some, the ultimate foundation) of reality may have the advantageous effect of spurring both scientific and philosophic interests

to consider methods and assumptions that deviate from, as well as compliment, those of current scientific approaches to reality (e.g., Gendlin, 1962; Kuhn, 1962).

It is worth noting, in this regard, that a number of biologists and physicists have begun staking out theoretical positions on topics such as localization of the assumed interaction between consciousness and the brain (e.g., dendrons, microtubules, the paracrystalline structure of the presynaptic vesicular grid; e.g., Eccles, 1994; Hamerhoff & Penrose, 1996; Penrose, 1989; for review, see Smith, 2003), issues pertaining to causal closure (Collins, 2008; Eccles, 1994; Marganau, 1984; Stapp, 2011), the independent, non-constructed, reality of consciousness (e.g., Bohm, 1980; Bohr, 1958; LeShan & Marganau, 1982; Stapp, 1993, 2011), etc. Regardless of the outcome of these—in my opinion—worthy endeavors, viewing consciousness as an entity perceived by, and thus necessarily in interaction with, the brain, rather than as a function or product of the brain that is amenable to reductive analysis exclusively in terms of neural activity, may provide a useful alternative to current scientific practice/assumptions as well as a potentially fruitful heuristic for helping to close Chalmers's (1996) conceptual gap.

HOW MIGHT EPISTEMOLOGICAL SELF-KNOWLEDGE BE RENDERED UNAVAILABLE TO THE ONTOLOGICAL SELF? ONE POSSIBILITY

To address this question, I restrict my focus to the simpler case of persons suffering deficits only in episodic recollection (the patients just described, by contrast, endured a mixture of episodic and semantic memory impairments). Episodic memory involves the ability to re-experience an event as having-happened-to-me (e.g., Tulving, 1983; a more precise definition is offered below).

According to metarepresentation theory (e.g., Leslie, 1987), episodic memory involves the conceptual element/concept self inserted into the agent tag of a metarepresentation of a personal event. For example, the ability to reflect upon the self, in metarepresentational terms entails the ability to form representations which are representations about other mental representations, whether one's own or others'. In Leslie's (1987, 2000) account, these metarepresentations are data files with a particular format, including slots for an agent (e.g., I, You, Dad, Ellen), that agent's attitude toward a proposition (e.g., believe, doubt, hope, remember), and an embedded proposition (e.g., "it is raining," "I became anxious at the zoo," "I thought that modern art is ugly"; for discussion of this theory and its relation to autobiographical memory, see Klein, German, Cosmides, & Gabriel, 2004).

If that self as agent tag were somehow disturbed or disabled, then the event could be recalled without having the experience of it as having-happened-to-me. This, in turn, would render episodic self-knowledge as potentially less relevant to the ontological self (recall that ownership is one of the seven epistemic sources of one's sense of personal subjectivity).

Consider, for example, the case of R.B., a 43-year-old male who suffered a serious head injury in a car accident (for greater detail, see Klein & Nichols, in press). Almost immediately following his accident, he was able to consciously retrieve events from his past, yet his recollection of those events was severely compromised—he could not remember the events as having been personally experienced!

This apparent paradox—conscious retrieval of past events absent a sense of having-happened-to-me—is resolved by situating episodic memory in the context of a system of interrelated self/memory processes, some of which provide the raw data for experience and some of which enable the experience to be mine. What is at issue is the quality and content of his experience, which, until other methods are developed, is best assessed by the patient's self-reports (e.g., Baars, 1988; Strawson, 2009). R.B. describes in his own words what it is like to remember personal events lacking personal ownership:

What I realized was that I did not "own" any memories that came before my injury. I knew things that came before my injury. In fact, it seemed that my memory was just fine for things that happened going back years in the past (The period close to the injury was more disrupted.) I could answer any question about where I lived at different times in my life, who my friends were, where I went to school, activities I enjoyed, etc. But none of it was "me." It was the same sort of knowledge I might have about how my parents met or the history of the Civil War or something like that.

Of relevance to the question at hand—self-ownership and episodic memory—R.B. was able to remember particular incidents from his life accompanied by temporal, spatial and self-referential knowledge, but he did not feel the memories he experienced belonged to him. In his own words, they lacked ownership.

This particular form of memory impairment—episodic recollection absent a sense of personal ownership, is a form of memory dissociation that, to my knowledge, has not previously been documented in the neurological literature. There are, however, two cases that bear some similarity. One is from a case study of an amnesic reported by Talland (1964). Unfortunately, the data available from that brief report, while suggestive, do not permit strong conclusions. In the other case (Stuss & Guzman, 1988), a patient semantically relearned his personal history following a case of severe retrograde episodic amnesia spanning most of his past life history. The patient commented that the relearned memories seemed to lack a feel of real happenings in his life. They were, to him, more like stories and facts told to him by others (which, indeed, they were!). In this sense, they were more like semantic facts about himself (e.g., Klein & Nichols, *in press*) than episodic recollections: The patient knew his memories were about him, but he did not remember them as temporally and spatially acquired in the correct context (i.e., when they transpired). That is, they were memories that temporally and spatially were experienced (they consisted in the recall of information acquired following the onset of his retrograde memory loss) as second hand stories told to him at a particular time and place.

So, are R.B.'s recollections episodic or semantic? I believe, and the evidence strongly suggests (Klein & Nichols, *in press*), the former. Almost immediately following his accident, R.B. was able to intentionally recall specific events temporally and spatially situated in his personal past, but his recollection of those events was compromised in an unusual manner—memory for those events, though fitting the criteria for episodic recollection (see below), were not accompanied by a sense of personal ownership.

For example, approximately two months following release from the hospital, R.B. offers the following description of what it is like for him to recall personal

events: "I was remembering scenes, not facts. I was recalling scenes...I can clearly recall a scene of me at the beach in New London, Connecticut with my family as a child. But the feeling is that the scene is not my memory. As if I am looking at a movie of someone else's vacation."

Episodic memories, as traditionally defined, consist in three attributes—temporal, spatial, and self-referential (e.g., Klein, 2004; Klein et al., 2004; Klein & Lax, 2010; Parkin, 1997; Tulving, 1972, 1983, 1995; Wheeler, Stuss, & Tulving, 1997). Semantic memory, by contrast, largely enables retrieval of impersonal facts (e.g., "A bird is an animal": however, as cases such as that of D.B. make clear, one also can remember semantic autobiographical facts—e.g., "I was born in New York"). By these criteria, R.B.'s descriptions of his memory experience leave little doubt that they are personal recollections, appropriately situated in time and space, rather than factual semantic knowledge. With specific regard to nonepisodic (i.e., semantic) memory, his comments clearly reveal a normal semantic knowledge base underlying his memorial experience:

When I think about examples like "that is my hand, the President is Bush, I like pizza, I am kind", each one is part of the things I know in the present. They feel like things that I know, not things that someone else knew.

R.B.'s "episodic" memories all were substantiated by third parties as valid renditions of events that actually transpired in R.B.'s life. While his recollections satisfy the criteria for episodic memory—time, place, and self—they simultaneously exhibit a highly atypical absence of experienced ownership. This absence of ownership again is evident in R.B.'s response to instructions to recall personal memories from time spent in graduate school:

I can picture the scene perfectly clearly...studying with my friends in our study lounge. I can "relive" it in the sense of re-running the experience of being there. But it has the feeling of imagining, [as if] re-running an experience that my parents described from their college days. It did not feel like it was something that really had been a part of my life. Intellectually I suppose I never doubted that it was a part of my life. Perhaps because there was such continuity of memories that fit a pattern that lead up to the present time. But that in itself did not help change the feeling of ownership.

He continues, "Those scenes of being at MIT were vivid, but they were not mine. But I owned the fact that I had a degree from MIT."

Once again, R.B.'s memory performance adheres closely to the definition of episodic recollection: He can remember where the events transpired, when the events took place and that they directly involved him. And, they are not simply autobiographical semantic knowledge or inferences based on semantic memory (although, as his response makes clear, he is capable of such inference).⁴ Finally, as

4. Additional data, reported in Klein and Nichols (in press), makes clear that R.B.'s personal recollections were indeed episodic and not semantic. For example, R.B. retained the capacity to plan for his personal future—an ability that repeatedly has been shown to depend critically on intact episodic memory (e.g., Atance & O'Neill, 2005; Hassabis, Kumaran, Vann, & Maguire, 2007; Klein, Loftus, & Kihlstrom, 2002).

the last quote makes apparent, ownership issues are restricted to R.B.'s "episodic" memories. They are not an issue for semantic facts of a personal nature.

Thus, R.B.'s description is consistent with the notion that neural machinery that can insert the conceptual element self into the agent slot of an episodic memory metarepresentation was compromised by his injury (but only for those events that occurred in the time period preceding his injury; i.e., he suffered a highly unusual form of retrograde amnesia.)⁵ The fact that R.B. was able to recover the ownership function several months following his injury suggests that the self-referential aspect of his recollections was not destroyed by his injury. This also is implied by the fact that he had: (a) a sense of personal ownership of ongoing experiences that occurred after the accident that impaired his memory, and (b) he had a sense of ownership of his semantic self-knowledge. Why his mental machinery was able to insert a self-as-agent tag into episodic memories as they were being built but not into recollections of past events is unclear, and underlines the importance of understanding how, exactly, temporality is represented by the brain (e.g., Dalla Barba, 2002; Tulving & Lepage, 2000).

These findings, and others like them (see Klein, 2004, 2010; Klein et al., 2004, for reviews of the evidence), support the conclusion that a number of computational processes—the ability to self-reflect, a sense of personal agency/ownership, and an awareness of the self as being situated within a temporal framework—are involved in the transformation of declarative knowledge into an autobiographical experience (for review, see Klein et al., 2004). On this view, episodic retrieval—the generation and/or recovery (depending on one's interpretation of the evidence) of autobiographical memorial experiences—cannot occur normally unless all of these capacities are intact.

To be experienced as self-referential, the knowledge must be tagged as one's own (though apparently not claimed as one's own). Otherwise, R.B.'s subjective experience (the ontological self), apparently unaffected by his accident, is unable to append that knowledge (i.e., the epistemological self) as a personal experience of his ontological self. Put another way, while R.B. maintains perspectival ownership (i.e., the thoughts issue directly from me), he has lost personal ownership (i.e., those thoughts are part of my corpus of personally experienced events—that is, they are experienced as having been lived by me).

THE TWO SELVES: THE OBJECTIVE SELF OF SCIENCE AND THE SUBJECTIVE SELF OF PERSONAL AWARENESS

Part of the difficulty surrounding study of the self is the failure by many researchers to appreciate that its singular subjectivity—what I am calling the ontological self—is not the object of their experimental studies. Indeed, it 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 (e.g., Earle, 1955; Foster, 1991;

5. Strawson (2009), points out that there is a potentially important distinction here between the ownership and authorship of R.B.'s episodic self-knowledge. While I will not address this issue in the present paper, a manuscript in preparation on the implications of the case of R.B. for models of declarative long-term memory will address this complex issue.

Nagel, 1974; Popper, 1994); i.e., it is something other than the self (e.g., Zahavi, 1999). When objectivity is the stance adopted by the ontological self to study itself, it must, of necessity, be directed toward what is not the self but rather to some "other" that serves as the self's object (e.g., Earle, 1972; Husserl, 1964; Loizou, 2000; Lund, 2005; Nagel, 1974; Zahavi, 2005). To study myself as an object, I must transform myself into an other, into a not-self (e.g., Loy, 1988).

Thus, the self is not, and cannot, be an object for itself and still maintain its subjectivity. Paradoxically, we can achieve objectivity of the ontological self only at the cost of losing awareness of our self as a subjective center.⁶

We can, of course, adopt what have been called self-reflexive, meta, or higher-order-thought (e.g., Gennaro, 1996; Rosenthal, 1986; Terrace & Metcalfe, 2005), in which a previous experience or thought subsequently is taken as the object of the intentionality of consciousness (what I am calling the ontological or subjective self). Indeed, we commonly do so (e.g., Dennett, 1996). But in this case, the original subjectivity has relinquished its status as subject to become an object or other for the self to consider. Accordingly, a vicious regress of higher-order-thoughts is likely to ensue (e.g., I think about the pain I felt; I think about the thought of the pain I felt; I think about the thought of the thought of the pain I felt...ad infinitum; there need be no necessary regress, however, when the knowledge under discussion is purely by acquaintance.)

Clearly then, a thought may become an object and be apprehended by the subjective self. As an object, it is dependent upon physiological or nervous or whatever conditions it depends on. But the ontological self does not supply those conditions (e.g., Albahari, 2006; Earle, 1972; Husserl, 1964; Persson, 2005). The thought is not dependent upon its apprehension (e.g., Loy, 1988; Strawson, 2009). Once apprehended by the ontological self, the thought becomes an other (i.e., an object of the self's subjectivity) in the manner all objects (both external and internal) must, of necessity become when apprehended (e.g., Krueger, 2011; Zahavi, 1999, 2005, 2011).

Accordingly, we can never observe the ontological self directly. Rather, what we encounter in self-awareness is the object of that awareness or apprehension. The awareness itself remains in hidden in the background, an unseen and unseeable subjectivity that provides the conscious self with awareness of its acts, perception, and thoughts.

These ideas are not new. For example, they have considerable overlap with the view (originally attributed to 19th century philosopher Franz Brentano) that con-

6. There is disagreement among contemporary philosophers over this contention. The basic idea I have presented can be traced back several thousand years to the Eastern philosophical position that the self is like the "eye that cannot see itself" or the "light that cannot illuminate itself" (for reviews, see Albahari, 2006; Loy, 1988). But, as Strawson (2009, 2011a) argues, there is no compelling reason in principle why the self has to fail to know itself as it really is. After all, he contends, it is phenomenologically given that one can have thoughts that are directly about themselves (i.e., self-referential): e.g., "this (very) thought is very puzzling."

Along similar lines, Bunge (personal correspondence) contends that my claim that self is not a legitimate object of scientific inquiry clashes with my own empirical studies of the self. I take this critique to be based, in part, on Professor Bunge's failure to appreciate the distinction between the Ontological and Empirical selves. Bunge, however, feels quite differently and maintains: "Your study of my experience of self-awareness is not basically different from my cardiologist's examination of my heart's condition, even though he cannot feel the pain I feel in my heart when lifting a heavy thing. The same holds for all psychological studies of qualia." Professor Bunge and I will have to agree to disagree on this very deep issue, as it will not be resolved herein.

consciousness always must be intentional. This means the ontological (i.e., conscious) self must be about something other than itself; it must have an object (whether physical or mental); and that a pure consciousness, absent its object, cannot be known. In short, consciousness devoid of an intentional object is not possible (various forms of Eastern religious thought take issue with this idea, positing the possibility of attaining and experiencing pure consciousness—i.e., consciousness absent an object; for reviews see Forman, 1990; Loy, 1988; Siderits, 2003).

SCIENCE AND THE ONTOLOGICAL SELF

Given these considerations, the ontological self would seem a particularly poor candidate for scientific exploration—an enterprise predicated on understanding objects and their relations. Science is the world of publically observable and/or physically measurable objects and events (both direct and indirect; via mechanical device, physical record or other indicators; e.g., Bunge, 2010). 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 (e.g., Albahari, 2006; Earle, 1972; Foster, 1991; Jackson, 1986; Loizou, 2000; Lund, 2005; Nagel, 1974; Zahavi, 2005). 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.

Thus, when Hume (1748/2004) famously looked for the ontological self in his perceptions and thoughts, he lamented that while he found the objects of his subjectivity, the subjectivity, *per se*, never materialized (for extended discussion, see Baxter, 2008). However, as I think I have shown, Hume's failure to find his own subjectivity is not a reasonable objection to its existence. In point of fact, he was looking for the wrong thing in the wrong way. His metaphysical or methodological presuppositions prevented him (or anyone engaging in a similar enterprise) from recognizing that the ontological self is not something one can find by inner reflection.

Nor is the ontological self something one can locate via inference. I do not posit myself nor do I have to guess that I exist. I am immediately aware of my self as myself, as a unique subjectivity (e.g., Earle, 1972; Husserl, 1964; Krueger, 2011; Lund, 2005; Papa-Grimaldi, 1998; Persson, 2005; Stawson, 2009; Zahavi, 1999, 2005, 2011). And I am immediately aware of my feelings, beliefs, memories, knowledge, decisions, judgments and acts (i.e., the domain of psychological processes, which constitute the epistemological self) as mine. These things cannot force themselves, via some scientifically accepted mechanism of physical forces, to be known (Earle, 1955). How, for example, could the future, which so greatly influences subjectivity in the form of thought and planning (e.g., Klein, Robertson, & Delton, 2010, 2011) be physically causal when it does not even exist? Rather, this mentation (i.e., the future) can be treated as an object of awareness and thus can be grasped or apprehended by the ontological self. But, lacking objective existence (e.g., Dolev, 2007; Strawson, 2007), the future, *per se*, is not obviously amenable to empirical analysis.

Given these issues, some (e.g., epiphenomenalists, eliminative materialists) have tried to banish the ontological self from investigation, arguing that it is an illusion, the anachronistic myth of a folk-psychology that rapidly is being replaced by advances in the neurosciences (most of which are still hidden in the future—hence

the promissory note aspect of the eliminativist program; e.g., Churchland, 1986; for a critique, see Hasker, 1999).

Exemplifying such thinking, Metzinger (2009) recently pronounced the self to be nothing more than an illusion posited to explain acts and thoughts that ultimately will be reducible to the actions of neurons and their interconnections. But after the dust of promised reductive analyses clears, a simple question remains—to or for whom is the self an illusion? An illusion is an experience and an experience requires an experiencer. Some might counter that there is no need for a self since consciousness, *per se*, is self-reflective or self-illuminating, and thus the experiencer (e.g., Albahari, 2006; Krueger, 2011). But this move (common in Eastern philosophical traditions; e.g., Albahar, 2006 for review see Siderits et al., 2011) serves only to conflate consciousness with subjectivity and hence, by many definitions (e.g., Earle, 1972; Lund, 2005; Strawson, 2009; Zahavi, 2005, 2011), with the self (in my terms, with the ontological self). There is a mystery here and it will not go away by sweeping it under a metaphysical rug.

In sum, when psychologists focus on the self, more often than not, what we are investigating actually is the multiplicity of neural systems assumed to provide the ontological self with knowledge. Our tacit assumption is that there is a substantive, objective self, which, like any object (provided proper tools are available), can be treated as other and thus found, grasped, and studied scientifically (e.g., Bunge, 2010; but see LeShan & Marganau, 1982; Marganau, 1984). While this assumption has merit for the study of epistemological sources of self-knowledge, psychologists often fail to 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 profoundly important differences between self as a subjective entity (the ontological self) and the self as types of knowledge available to that subjectivity (i.e., the epistemological bases of self-knowledge; for discussion, see Earle, 1972; Evans, 1970; Foster, 1991; Giles, 1997; Hasker, 1999; Krueger, 2011; Lowe, 1996; Lund, 2005; Shoemaker & Swinburne, 1984; Siderits, et al., 2011; Strawson, 2009; Zahavi, 1999, 2005). The two selves are contingently related, but are not conceptually reducible. By conflating them, we assume we are casting empirical light on one (the ontological self) all-the-while experimentally exploring the other (epistemological self-knowledge).

AN EXAMPLE

This confusion between meanings of the term self is brought into clear focus by the recent proliferation of brain-scanning studies attempting to locate the neural correlates of Self (for meta-analytic reviews, see Gillihan & Farah, 2005; Northoff et al., 2005). However, as these reviewers lament, attempted localizations have been far from encouraging (for a discussion of the plurality of self and the possibility of its neural localization, see Klein & Gangi, 2010; Ruby & Legrand, 2007).

One reason for these disappointing results is that the self being searched for by brain-scanners is not the subjective, ontological self (which is not an object, and thus cannot be neurally localized), but rather a diverse collection of self-relevant neurological systems that provide knowledge and experiences for the ontological self. They are independent of apprehension by the ontological self (though they can become objects for it), and thus neuroimaging analyses are warranted.

However, the diversity of systems self knowledge, and their presumed neural correlates, has the unintended result of showing the Self to be an entity that lacks clear neural localization (for a related view, see Legrand & Ruby, 2009).

The ontological self, by contrast, lacks a clear descriptive identity (see section one of this chapter). As Polanyi (1967) cautioned "...either you know what you are looking for, and then there is no problem; or you do not know what you are looking for, and then you cannot expect to find anything" (p. 22). Small wonder meta-analytic assessments of the success of self-localization via imaging techniques have been so discouraging (e.g., Gillian & Farrah, 2005; Ruby & Legrand, 2007). Put more positively, what these studies seem to be telling us is that the self is not a thing to be found, and thus the idea of localizing a neural entity called the Self is a non-starter (e.g., Klein, Lax, & Gangi, 2010).

Ultimately what carries as much importance as the specificity with which imaging techniques can capture neural activity (for critical discussion, see Miller et al., 2002; Miller et al., in press; Uttal, 2001; Vul, Harris, Winkielman, & Pashler, 2009) is the specificity with which the constructs we submit to scanning capture the essence of what they are intended to describe (e.g., Uttal, 2001).

RENDER TO SCIENCE ONLY WHAT BELONGS TO SCIENCE: A PLURALISTIC APPROACH?

The view I am advocating would seem to have much in common with traditional dualist views of self, beginning in modern times with Descartes (but, as Sorabji, 2006 documents, similar ideas precede Descartes by thousands of years; e.g., Parmenides), culminating in James (1890) distinction between self-as-known and self-as knower (In fairness to James, his self-dichotomy does not, strictly speaking, imply dualism. Rather, he speaks of the different functions, or levels of a common substance—the self—conceptually joined with the notion of reflexivity). However, dualism presumes that reality can meaningfully be divided into two substances/processes, an assumption that has no more evidential backing than do the monistic (e.g., physicalism, materialism) theoretical commitments that characterize the beliefs of many modern psychologists.

In contrast, my analysis takes it as a logical possibility that reality consists in a multiplicity of substance/function some of which we label material, some which we label mind, and yet others to-date unlabeled (e.g., James, 1909/1996; Martin, 2008; Papa-Grimaldi, 1998). To assume that materialism or physical monism exhausts the nature of reality is, at this point, little more than scientific hubris. Such "scientism" (e.g., Tallis, 2008; see also Feyerabend, 1979; Marganau, 1984; Stove, 2001) forecloses, in advance of full understanding, what we allow to stand as reality by presupposing that we have license to assert (without evidence) that reality, in its fullness, can be captured by our present concepts, methods, and instruments of measurement (e.g., Horst, 2007). In short, I believe it presumptuous to assume that we have been able (or, indeed, have the capacity to be able; McGinn, 1991) to survey all reality in its complexity.

What I am suggesting, therefore, with respect to the self, is that the scope of scientific analysis, while well-suited to the study of behavioral/neural properties identified as components of self-knowledge, the ontological self, as a singular, conscious, knowing subjectivity, does not readily fit into the scientific framework for

addressing nature. Putting this very complex matter in the form of a simple question: “how does a subjectivity, a unified, individual point of view, treat itself as an object of subjectivity while retaining its nature—that of subjectivity?” Short of falling into the trap of a conceptual regress (or the positing of, what seem to me, weakly motivated constraints to reign in that regress—e.g., Rosenthal, 1986), the answer appears to fall outside the scope of current scientific inquiry.

It has become increasingly clear to many philosophers and philosophically minded scientists that not every question we are capable of addressing to nature is amenable to a scientific answer (e.g., Bohm, 1980; Braude, 1995; Bohr, 1958; Denbigh, 1981; Earle, 1972; Eccles, 1994; Feyerabend, 2011; Foster, 1991; Hyman, 2007; Kitchener, 1988; Loy, 1988; LeShan & Marganau, 1982; Marganau, 1950, 1984; Nagel & Newman, 2001; Popper, 1994; Schrodinger, 1961/1964, 1967; Snow, 1961; Stanford, 2006; Stove, 2001; Trusted, 1999). The ontological self is one such entity not capable of scientific (e.g., Earle, 1972; Kant, 1929/1965; Papa-Grimaldi, 1998) or mathematical (e.g., Stapp, 2011; Weyl, 1918/1987) formalism. One must render to science what belongs to science, but not all reality is transparent to its terms and methods (e.g., Loy, 1988).

Psychology, for the most part, grounds itself in scientific procedures and terminology. Great progress has been made on the epistemology of self-knowledge. But, questions concerning the ontology of the self (or time, or consciousness—three terms that I firmly believe are intimately related) either are pushed out of existence due to their failure to conform to scientific analysis (e.g., see physical monism, eliminative materialism, psycho-neural identity theory, and a variety of reductive analyses; e.g., Eccles, 1994; Feyerabend, 2011; Hasker, 1999; Horst, 2007; Papa-Grimaldi, 1998), or are mistakenly believed to have been addressed by work which has, in actuality, been designed to explicate more scientifically tractable questions concerning the epistemological self.

A POSSIBLE RESOLUTION OF THE PROBLEM OF DIACHRONIC PERSONAL IDENTITY

Early in this paper I introduced the problem of personal diachronicity (i.e., the identity of self over time) and the problems that ensue when one tries to resolve this issue via theories tied to psychological continuity or connectedness. The problem for those who adopt this position is that, on the one hand, the act of experiencing a personal memory presupposes a sense that the memory is not just any memory, but my memory. At the same time, knowledge of self is assumed to be based on the content of memory. The apparent circularity of this relation, and the ensuing infinite regress it portends, has long been recognized both by philosophers (e.g., Locke, 1690/1731; Schectman, 1996) and psychologists (e.g., James, 1890; Warnock, 1987; see Klein, 2001, 2010, for review).

The goal of this section is to spell out the nature of an assumed tautology between self and memory that appears to undermine the possibility of grounding personal identity in psychological (specifically, memorial) connectedness (for recent discussion, see Klein & Nichols, in press), and to offer a possible solution. My proposed resolution is that the assumed circularity is more apparent than real, and that it can be successfully addressed once one recognizes that the self is not a unitary construct.

The prototypical example of the circular nature of the relation between self and memory is found in John Locke's (1690/1731) theory of self and memory. For Locke, what makes a person the same across time (i.e., diachronic personal identity) is relations of memory: It is by memory of a past action that I am identical with a past person. (Locke actually used the word *consciousness*, but his intended meaning has widely been interpreted as referring to what we now call episodic memory; e.g., Klein & Nichols, *in press*; Shoemaker & Swinburne, 1984).

Locke's critics were quick to point out that 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 (e.g., Butler 1736/1819; Reid, 1785). If it wasn't me who performed the action, then my apparent recollection is simply a mistake, not a memory. As Butler (1736/1819) put it, "one should really think it self-evident, consciousness of personal identity presupposes, and therefore cannot constitute, personal identity" (p. 290). If episodic memory presupposes self, then trying to give an account of self in terms of memory (and vice versa) seems hopeless.

The apparent 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, and that it can be successfully addressed once one recognizes that the self is not a unitary construct (nor, for that matter is memory; e.g., Klein & Gangi, 2010; Tulving, 1983). Rather, as previously addressed, it admits to (at least) a two-fold instantiation as both epistemological and ontological in nature.

The multiple composition of self suggests that the general issue of self/memory circularity may be avoided in several ways. First, as my previous discussion hopefully has made clear, the self as epistemological is not reducible to memory. Rather, memory (e.g., episodic) is simply one source of the epistemic content that contributes to our phenomenological experience of the self as subjectivity. Thus, it may be possible to ground personal identity in the relative stability of other sources of epistemic self-knowledge (e.g., semantic trait self-knowledge which, as Klein & Lax, 2010, have shown, is remarkably resilient in the face of neural damage; or a continuing sense of personal agency, e.g., Oshana, 2010).

Second, while epistemological aspects of self are not necessarily occurrent or invariant (Reid and Butler both express 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 invariant; for a similar view, see the Eastern Wisdom Tradition on features of consciousness—e.g., Albahari, 2006; Siderits, 2003). Galen Strawson (2011b) points out in a lovely book on Locke 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 (since it would require time to reconstruct a coherent, sufficiently unbroken self-narrative, epistemological sources of diachronicity could not provide the occurrent sense of identity I take it most people refer to when they claim to experience a sameness of self over time).

Regardless of 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) factors could play a role in contributing to self-diachronicity. None of these epistemological aspects of self can easily be seen as entailing the definitional circularity often identified when diachronicity is assumed to be based on episodic memory (for discussion, see Klein, *in press*), and (b) given the presumed invariance of the ontological, consciousness aspect of self (for extensive discussion of this attribute of the ontological self, see the section *When am I?: The Ontological Self and Time*, below), if one takes Locke literally at his word (i.e., consciousness means consciousness!), the vicious regress can, at least in principle, be broken.

WHEN AM I?: THE ONTOLOGICAL SELF AND TIME

So far, I have tried to make the case that the ontological self is logically separable from epistemological self, even though the two co-vary contingently in living humans. I also have argued that while the domain of scientific inquiry can and does focus on the epistemological self, the ontological self, being each individual's unique subjectivity, is not obviously amenable to scientific analysis (e.g., Earle, 1972; Nagel, 1974; Marganau, 1984; Schrodinger, 1967; for a well-reasoned argument to the contrary, see Baars, 1988).

However, this assessment does not mean that we are unable make philosophically and experientially informed judgments about the ontological self based on observations within the purview of science (e.g., Strawson, 2009; see also the section above titled *So, what is the ontological self?*). That is, we can attempt to naturalize our philosophizing (e.g., Baillie, 1993; Flanagan, 2002) so that our speculations are constrained, at least to a degree, by objective experience as well as by their logical coherence.

What I intend to do in this section is discuss what we can logically and coherently stipulate about the relation between the ontological self and one of its assumed aspects—temporality—gleaned from experiences of personal subjectivity, inferences about the subjectivity of others, and inferences about the subjectivity of patients suffering neurological deficits.

Before proceeding, it is helpful to offer a few words on the topic of temporality, a subject equally vexing as that of the self. Beginning with McTaggart (1908; though, as often is the case, related ideas can be found in stretching back to antiquity; for review; e.g., Mooij, 2005), there have been two dominant, apparently incompatible views of time. (Actually, McTaggart voiced additional views of temporality—e.g., the C series—but this plurality does not concern us here.) There also have been attempts, largely unsuccessful, to force compatibility between these views via reduction of one to the other (for reviews, see Loizou, 1986; McLure, 2005; Tallant, 2007).

One view (which McTaggart calls his A series) considers time as a flowing of events from future to present to past. Thus events continually are changing their temporal identity—that which once was future eventually becomes present and

that which is present will, with time's flow, recede further and further into the past. A second view (McTaggart's B series) sees temporality as a static set of pre-existing relations between events—an idea sometimes termed the block universe (e.g., Barbour, 2000). In this scenario, all events pre-exist in their temporal relations (running earlier to later or, equivalently, later to earlier) and thus never change their temporal status. Time is frozen into an unchanging pattern of before and after: Tuesday 1997 comes prior to Wednesday 1998, and the terms of that relation never change their temporal status (for recent reviews, arguments and caveats, see Barbour, 2000; Dainton, 2001; McLure, 2005; Papa-Grimaldi, 1998).

Logically implicit in both of these views is that there is a conscious, subjective observer, who stands outside of time and observes the temporal changes of events or the static relations between them (e.g., Barbour, 2000; Oakeley, 1930; for a related, Buddhist view, see Albahari, 2006⁷). Not only that, a consciousness of the present is required to enable its owner to imagine a future and past, neither of which can be directly subjected to scientific analysis, since neither currently exist and thus cannot serve as objects for scientific manipulation and analysis (e.g., Faye, 1989; Lieb, 1991; Mead, 1932/2002).

This idea—that consciousness stands outside objective reality, yet knows, and, according to some interpretations, is active in creation of reality, is a minority view, yet well-known to science (e.g., Barrow, 1998; Kafatos & Nadeau, 1990; Norris, 2000; Omnes, 1999; Papa-Grimaldi, 1998; Rosenblum & Kuttner, 2006; Stapp, 1993, 2011) and eastern philosophy (for review, see Albahari, 2006; Loy, 1988; Siderits, 2003). In fact, some physical models of reality require a causally active consciousness to explain the world as we experience it—e.g., the collapse of the wave function as a result of conscious measurement, which selects a reality from a set of probabilities and replaces it with a specific concrete instantiation as a result of that observation (e.g., Copenhagen interpretation of quantum mechanics; for discussions, see Bohr, 1958; Heisenberg, 1958/1999; Reichenbach, 1951; Rosenblum & Kuttner, 2006; Stapp, 2011; but see Bunge, 2010, for a critical view of the Copenhagen interpretation).

Thus, the ontological self of personal subjectivity appears to be outside of time (e.g., Earle, 1972; Papa-Grimaldi, 1998). Earle reaches his conclusion from his analysis of the necessary and sufficient condition for memorial acquaintance with the past, which need not concern us here. Rather, I want to present an argument based on a different set of considerations and observations which, taken as a whole, point in the same direction as Earle's conclusion. If my arguments are convincing, I will have called into question the assumed relevance of one of the key constituents of modern science—time (the other being space; e.g., Campbell, 1920/1957; Edgington, 1958; Jeans, 1981; Ladyman, 2002; Planck, 1925/1993; Reichenbach, 1951; Swinburne, 1981) to assumed properties of the ontological self.

7. While it is true that Albahari conceives of consciousness (what she terms witness consciousness) as distinct from the self (which, she argues, is illusory), others (e.g., Zahavi, 2011) have noted that the attributes she endows witness consciousness are the same ones typically associated with models of what I am calling the ontological aspect of self.

SUBJECTIVITY OUTSIDE OF TEMPORALITY: SOME OBSERVATIONS

One remarkable, though seldom commented on, observation about the self of subjective awareness is that, from an inner-perspective (the only one possible!), it does not appear to age in a manner shared by other biological entities (for a discussion of existential and phenomenological views on this topic, see Zahavi, 1999). As we accumulate years our memories grow faulty, decision making slows, our perceptive abilities deteriorate, our limbs become weak, face and hands wrinkle. Thus is the fate of all material being. But, as hinted at by some of the case studies previously reviewed, the conscious self does not seem subject (at least in an obvious manner) to the breakdowns suffered by material objects.

For example, it is not uncommon for a person to comment that he or she feels to be the same person now she or he always has been. The lament "Why must I grow old and how can I stop it?" is mankind's eternal bane. It is responsible for such diverse countering maneuvers as our longstanding search for a fountain of youth to the seemingly endless market for products claiming to reverse, or at least deal with, the aging process: e.g., reading glasses, memory aides, dietary supplements that enhance clarity of thought, wrinkle creams, and energy drinks that would have seemed a superfluous indulgence in our youth. (For those readers old enough to be familiar with the ideas of Freud, the temporal experiences just described echo to a significant degree Freud's attribution of temporality to the unconscious part of the mind.)

But (to my knowledge) no one has yet to market a product designed to stop subjectivity from aging. We may know different things about our self, assume different roles and take on their accompanying responsibilities. As we age we tire more easily—physical exertion becomes more of a chore and less of a game. In short, the psycho-physical earthly manifestation in general, and the epistemological self in particular, clearly are not invariant.

The same, however, cannot be said of the ontological self. The self of awareness does not seem subject to the infirmities brought about by the passage of time. We feel our self to just be, the same I that I always have been. We may be tired, distressed, depressed, agitated by the gradual demise of the neuro-biological systems that struggle to enable movement (both physically and mentally), that no longer deliver self-knowledge with the speed of youth. But our subjectivity shows no obvious signs of this wear, no aging in itself—just responses to its experience of aging body and mind.

Subjectivity (except in cases of dreamless sleep, vegetative coma and other, relatively uncommon, conditions—e.g., Prignatano & Schacter, 1991) does not slow down or diminish, at least not in a manner commensurate with the gradual diminishment found in our physical and mental acts and dispositions. Subjectivity observes the slowing down, feels the losses, and laments their passing. But it does so as an intact, subjective self, observing and experiencing the objects of aging without appearing to take part in the aging process. An observation, reported by Mike Gazzaniga (2009), typifies what I am trying to capture: "...when I asked my father how he felt (at age 78, unable to walk unaided), he simply stated: 'Mike, I

feel 12. I always have and always will'" (p. 178). Following suit, David Funder (2010) reports:

Years ago, my grandmother, then in her late 80s, told a little story that has stuck with me ever since. She recalled being a teenager around the turn of the (20th) century riding the El (elevated) train in Chicago. One day, she watched an "old lady" (who was probably much younger than she was when she told the story) shuffle slowly on board. "I remember wondering," she said, "what it must feel like to be that old?" "Well," she continued cheerfully, "now I know. It feels the same. Except you're older." (p. 687)

Along similar lines, Ringo Starr (former drummer for the Beatles) turned 70 in July of 2010. In response to a question about how he felt about reaching that milestone, he replied "As far as I'm concerned, in my head, I'm 24. That's just how it is" (Associated Press, July 6, 2010).

Of course, the plural of anecdote is not data. Nonetheless, it is reasonable to wonder why these and similar reported experiences of the ageless self are experienced as being more youthful than one's chronological age. Why not as old? Or older? I believe this has a lot to do with the age of the episodic memories available to inform the ontological self (as hinted below). For most of us getting up there in years, there is an episodic reminiscence bump (e.g., Janasari & Parkin, 1996; for review see Parkin, 1997) in which episodic self-knowledge is more accessible from one's teens and early twenties than from other years of one's life. However, there also is a recency effect (recall is best—baring amnesia—for recent episodes from one's life), and that is what reminds the ontological self of where it truly is with respect to time.

Of course, it also is critical to keep in mind that attributing an age to oneself often is a social endeavor (e.g., a response to a request for age-related information: "Why I am 59 years old, though it's interesting that I still feel as the same as I did when I was 18") and not something on which the temporally invariant ontological self typically reflects (although there certainly are times when we privately reminisce and note a sameness/invariance associated with the ontological self—e.g., the Gazzaniga example above; extensive work on the development of autobiographical memory suggests it is social both in its origins and structure; e.g., Fivush & Haden, 2003).

Clearly, as just mentioned, anecdotes are not the proper constituent of data. Consequently, I turn first to an interesting aspect of the phenomenological experience of persons suffering retrograde and/or anterograde episodic amnesia. Persons suffering episodic amnesia seldom show complete loss of access to memories (e.g., Baddeley, Wilson, & Watts, 1995; Parkin 1997; Whitty & Zangwill, 1977). Rather, one typically finds a temporal gradient of loss, in which more recent memories are less likely to survive than are earlier ones (e.g., Ribot, 1882).

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 (see below). 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 the passage of nearly 30 years since the onset of his anterograde 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 an even more extreme case of episodic memory loss. Patient D.B. (e.g., Klein, Cosmides, Costabile, & Mei, 2002), as a result of cardiac disruption and an attendant period of anoxia, 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, Loftus, & Kihlstrom, 2002).

Yet, despite these devastating losses of access to his epistemological self (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). He was a man stuck in the moment (e.g., Tulving, 1985), yet that fact did not play any obvious role in his experience of himself. Testing revealed that his knowledge of his personality was both accurate and reliable, and the continuity of his subjectivity showed no obvious impairment. He was intelligent, observant, polite, and inquisitive. In short, the absence of an awareness of the passage of time in the above cases did not appear to either trouble or to capture the attention of the ontological self unless the situation demanded 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 recollections would suggest; rather, we typically find the reverse—the patient is stuck in the past (provided he or she has access to some personal recollections) and 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 a vis personal temporality (a similar case, permitting similar inferences, can be found in Tulving, 1993).

A particularly unusual amnesic patient (Storrington, 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 post-injury 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 & Wearing, 1995.)

At the time of his memory testing (mid 1930s) B. knew nothing of the life he had lived post-poisoning 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 most 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 one-second consciousness). For our 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 awareness of aging. He has become a man of the eternal present. However, as Storring (1936) goes on to note 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. (Storring, 1936, pp. 75–76)

This is a person, Storring concluded, with a second-long consciousness who 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, planning, feeling, thinking center of subjectivity unperturbed by the passage of time.

We should not draw from these observations the conclusion 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., Bunge, 2010; Clayton, 2004) 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 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 (see also Gendlin, 1962).

CONCLUSIONS

In this paper I have argued that the ontological self is a subjective unity (e.g., Strawson, 2009; White, 1991). While it can apprehend diverse aspects of reality enabled by the epistemological self, e.g., by perceiving, remembering, anticipating, judging, and feeling, those acts of observation simply serve to bring a diverse world of external and internal content to the apprehension of the subject. And since that subject is, of necessity, one, the diverse aspects in its subjective field are

unified (thereby partially addressing the questions posed at the beginning of this chapter concerning synchronic and diachronic unity; e.g., Slors, 2001). Our subjective unity is the result of the unity of the observing subject. As Earle (1955) noted "Unity presides over every act of the mind, it is subjective, and it is in principle distinguishable from any real objective unity" (p. 54). He continues, "I am not any of the things I apprehend, and yet they all stand in my presence, and appear to me. The I to which all things can appear is the ultimate problem. It seems to be both nothing and yet relatable to everything" (p. 55). Perhaps the problem ultimately will be clarified. As of now the mystery remains.

Possibly we need a new, more inclusive, metaphysics (e.g., Earle, 1955; Feyrabend, 1979; Fodor, 1974; Gendlin, 1962; Kitchener, 1988; Martin, 2008; Papa-Grimaldi, 1998), one in which reality is not reduced to only that which can be manipulated by science. Reality is too broad to be captured by a single approach. Nor do we currently have any way of surveying the whole of reality. To maintain that all reality can be captured by a single set of methods (e.g., scientific) is to maintain that reality consists in its entirety of objects, processes, systems, and relations, i.e., those aspects capable of being grasped by a particular set of methodologies and theoretical assumptions. Quoting Earle (1955) again:

We have no way of surveying the whole of reality; we have only a formal idea of it on one hand, and an infinitesimally small assortment of unclear objects on the other...we must in other words hold our theory in precisely that tension which represents our honest position; we *don't* know what the entire character of reality is, and we should not attempt to close our ignorance through impatience with the infinity of the absolute itself. (p. 89)

A similar perspective, but more focally relevant to the issue at hand (i.e., the ontological and epistemological selves as objects of study), is offered by Gendlin (1962), who calls for:

...add[ing] a body of theory consisting of concepts of a different type—concepts that can refer to experiencing, and that can grasp the way in which experience functions [to]...distinguish this different order of concepts from logical and objective concepts, and to provide systematic methods for moving back and forth between the two orders. (p. 7)

Pointing directly at the heart of the matter, clinician and theoretician Carl Rodgers asks "Is there some view ... which might preserve the values of ... scientific advances... and yet find more room for the existing subjective person who is at the heart and base even of our system of science?" (cited in Gendlin, 1962, p. 48). The point being that the scientific methods that currently dominate psychology do not (and perhaps cannot) directly tap the heart of our discipline—subjectivity.

In short, it is unreasonable to try to fill in our ignorance of the scope of reality with theories that describe only those pieces of the whole that can be apprehended by our sense organs and reason (i.e., the objective, material world). This position that can be traced back at least 2,500 years in Western philosophy to Parmenides, and perhaps earlier in Eastern philosophical traditions; for discussions of this issue, see Geldard, 2007; LeShan & Marganau, 1982; Loy, 1988; Mazur, 2007; Tallis,

2008). As noted philosopher C. B. Martin (2008) concluded after devoting himself to these issues for more than half a century, if we wish to understand reality—its properties and causal interactions manifested therein—“New and basic ways of thinking are needed” (p. 197).

Applied specifically to the ontological self, to posit the self as capable of being grasped by such finite aspects of reality as matter, energy, or, more abstractly, universal laws, processes, or Platonic forms, is a very restrictive enterprise—one that presupposes we have warrant to declare (without concrete evidence) that reality, in its fullness, can be captured by such constructs (e.g., Feyerabend, 1979; Gendlin, 1962; Jackson, 1986; James, 1909/1996; Marganau, 1984; Papa-Grimaldi, 1998; van Fraassen, 2005).

I do not reject a scientific approach to reality. Science has proven an immensely successful way to question nature and has greatly enhanced our understanding of the aspects of reality it is designed to deal with (indeed my career has been informed by and devoted to it). What I do take issue with is the assumption (typically implicit) that the scientific method has exhausted our ways of apprehending and knowing reality. Render to science what belongs to science, but we should not surrender all of reality too hastily lest we fail to encounter vast mysteries not accommodated by its unique set of assumptions and methodologies.

There increasingly have been calls for attempts to unify our knowledge of reality (e.g., Damasio et al., 2001), but many of these attempts have been predicated on the belief (often implicit) that the scientific approach should serve as the foundation from which unity springs (e.g., Kosso, 2007). We do not need, nor do I believe it possible, to embrace the world, in its fullness, via a reductive enterprise wherein unity is little more than a code-word for scientific reduction (e.g., Earle, 1955; Hyman, 2007; Koestler & Smythies, 1967; Papa-Grimaldi, 1998; Vauhinger, 1925).

The views of self I have articulated—the self of science and the self of experience—both are real, both are valid; but it is important not to conflate them, to reduce the conscious self to the self of empirical exploration. What we need is a unity of knowledge that considers all aspects of experience as real (in this sense, my approach is far less dualistic than it might, to some, appear), and attempts to understand those experiences using all the tools currently available, with particular emphasis on the most complex tool of all—the human mind.

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