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The Journal of Mind and Behavior (JMB) is dedicated to the interdisciplinary approach within psychology and related fields. Mind and behavior position, interact, and causally relate to each other in multi directional ways; JMB urges the exploration of these interrelationships. The editors are particularly interested in scholarly work in the following areas: □ the psychology, philosophy, and sociology of experimentation and the scientific method □ the relationships among methodology, operationism, and theory construction □ the mind–body problem in the social sciences, psychiatry and the medical sciences, and the physical sciences □ philosophical impact of a mind–body epistemology upon psychology and its theories of consciousness □ critical examinations of the DSM–biopsychiatry–somatotherapy framework of thought and practice □ issues pertaining to the ethical study of cognition, self-awareness, and higher functions of consciousness in nonhuman animals □ phenomenological, teleological, existential, and introspective reports relevant to psychology, psychosocial methodology, and social philosophy □ historical perspectives on the course and nature of psychological science.

JMB is based upon the premise that all meaningful statements about human behavior rest ultimately upon observation — with no one scientific method possessing, a priori, greater credence than another. Emphasis upon experimental control should not preclude the experiment as a measure of behavior outside the scientific laboratory. The editors recognize the need to propagate ideas and speculations as well as the need to form empirical situations for testing them. However, we believe in a working reciprocity between theory and method (not a confounding), and in a unity among the sciences. Manuscripts should accentuate this interdisciplinary approach — either explicitly in their content, or implicitly within their point of view. (We typically do not publish empirical research.)

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Conscious States of Dreaming

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The purpose of this paper is to draw analogies between dreaming and quantum states of the mind and also to make inferences about the relationship between dreaming states, waking states, and memory. That dreaming is intrinsically associated with memory has been an opinion asserted by many researchers including Nielsen and Stenstrom (2005), Fosse, Fosse, Hobson, and Stickgold (2003), and Lee (2010). However, if dreaming is consciously recollected it must be that memory is also active at the time of dreaming, and if this is so, then the use of memory from dreaming must be associated with consciousness in the waking state. If a concept of consciousness is conceived as following from a layering of human perception, cognition, and physiological experience, then the brain may be understood as having the potential to produce quantum states — indeed the complexity of such brain states may make the experience of consciousness possible. The qualia of thoughts and consciousness, such as those experienced when dreams are recalled, can be likened to fluctuations in quantum states of the mind. Dreaming seems ephemeral yet may have a survival function.

Keywords: dreaming, quantum physics, memory

People are not simply conscious (awake) or not conscious (unconscious or asleep) [although they may be] but rather there are differing qualities and degrees of consciousness — such as dreaming — implicit in the cognitive frameworks with which people negotiate the experience of their worlds. So-called "lucid" dreamers, for example, are able to think clearly, to act or reflect whilst experiencing dreaming (LaBerge, 1990). The complexity of conscious and unconscious experience makes the consideration of quantum states a useful metaphor for understanding the interaction of sleeping, dreaming, and memory. Although dreams are likely to be the product of schema assimilation (and remembered dreams as if of recollected events

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experienced in consciousness) during sleep, the purpose of human dreams remains as elusive as the dream episodes themselves. Recognition of dreaming states involves the semi-conscious recollection of memory trace during the sleep consolidation-based stabilisation phase, as such dreaming might be considered a by-product of schema assimilation. Sleep is thus necessary for the consolidation-based enhancement of motor sequence learning (Doyon, Carrier, Simard, Tahar, Morin, Benali, and Ungerleider, 2005, p. 68).

Early research from Jenkins and Dallenbach (1924) indicated that the strength of a memory representation or "trace" could be more preserved by periods of sleep compared with time awake. This is because sensory processing during sleep is diminished compared to in an awakened state, whereas activity of memory processes may not be so, so more consolidation of memory can take place. Moruzzi and Magoun argued in 1949 that the function of sleep was to reinstate the activity of synapses, or to regulate brain processing. If so then memory of dreams involves both anterograde (future orientated) and retrograde (past-orientated) memory, as a remembered dream sequence involves recollection in the present of a future-orientated past physiological experience.

There are two main states of activity during sleep which are both natural cycles — REM sleep (rapid eye-movement sleep) and NREM sleep (non rapid-eye movement sleep). Typically NREM sleep is followed by a short period of REM sleep and dreaming occurs during the REM stage. Learning through habitual actions during consciousness are REM independent but as Greenberg and Pearlman (1974) put it, ". . . activities involving assimilation of unusual information require REM sleep for optimal consolidation" (p. 516). REM sleep is also that which is inductive to memory of dreams upon awakening. As Siegeal (2005) observes, although dreams contain emotions and events that don't correspond to previous days, dreams are not recalled unless they are immediately rehearsed in post-dream waking (p. 82). A person who awakes after the REM sleep cycle is more likely to remember her dreams than one who wakes after a NREM stage of sleep.

A definition from the second wave of sleep research, provided by Wamsley and Stickgold (2010), holds that, "[d]uring sleep, when attention to sensory input is at a minimum, the mind continues to process information, using memory fragments to create images, thoughts, and narratives that we commonly call 'dreaming'" (R1010). As such, dreams may be "spandrels of sleep" (Flanagan, 1995). The spandral, while an epiphenomenal term, also instantiates a complex neurological interaction. As Hahn, McFarland, Berberich, Sakmann, and Mehta (2012) suggested, the entorhinal cortex layer III is a mediator for memory consolidation during slow-wave sleep and it "inputs to the hippocampus in temporal association memory" (Suh, Rivest, Nakashiba, Tominaga, and Tonegawa, 2011, p. 1415). Furthermore, Nieuwenhuys, Voogt, and van Huijzen (2008) showed that the parahippocampal cortex, which receives diverse sensory-specific and

multimodal cortical information (a highly complex area of synaptic functioning) is also useful for REM sleep (see also Markowitsch and Staniloiu, 2013, p. 35). Such alteration of brain-wave functioning in various areas of the brain during sleep is consistent with fluctuations in the quanta of memory consolidation. If sleep reverses the deterioration in performance brought about from prolonged wakefulness, then REM sleep is modulated by the circadian rhythm (Groeger and Dijk, 2005, p. 73). Hobson (2005; Hobson, McCarley, and Wyzinsky, 1975) suggests that neurons which mediate non-REM and REM sleep are motor pattern generators coterminous with norepinephrine serotonin which is non-gating, allowing for conscious brain activity. Sleep, dreaming, and consciousness are thus states on a continuum of brainwave quantum functioning.

There are at least three possible ways in which dreaming and imagination are evident in the quantum physics analogies of the mind. The first begins with the fundamental understanding that quantum physics offers proof that the world we are part of, the world we observe, and our position as observers, brings the world into being. Dreams, which are figments of the imagination produced during sleep, may influence our waking states through either altered experiences of memory, mood, or perception of time and place. The second way dreaming and imagination emerges in quantum theory is as a product of the holism of the many minds theory (which might posit that a dreaming state is one of a near infinite number of possible states that a mind could assume at any one time), and the third is evident in the theoretical speculation that dreaming can be quantified in the "white noise" effect of the modified Schrödinger equation (the fundamental equation of wave mechanics which relates wave formation to the allowed energies of wave function).

At the quantum level, the world and ourselves are made of the same quanta. We are constituted in, and part creators of, the world we live in. While in quantum science it is clear that the world observed is in part created by the observer, it is not clear to what degree the observed world is dependent on the unique biological identity of the observer, or rather, dependent on the person's classical position as an observer. Peter Jackson (2002, p. 7) offers a useful synopsis of the role of consciousness in quantum theory:

> In the transition from the probabilistic quantum realm to the classical realm, a fundamental change occurs, and that appears to be brought about by the experience of the observer. This change takes the technical name of decoherence, in which the probabilities described by the wave function collapse to certainty (100% prob). In their unmeasured superimposed state, there are only probabilities, no actualities. But, as soon as we make a measurement, we create a certainty.

Decoherence is then also a property of a conscious mind, and possibly of the consolidation of memory processing during dreaming states. The question then becomes: is it consciousness that brings about the collapse of the wave function in quantum physics? Wigner claims that the content of consciousness

is the fundamental reality and it cannot be escaped but it may be altered in dreaming states (Esfeld, 1999). Quantum states may be realised as the product of chemical and electrical exchanges in synapses of the brain — experienced as the qualia that result from complex interactions of the enzymes, hormones, oxygen, polarization and depolarization which take place in neural cells and pathways. The reality of physical objects is, however, relative to the object's constitution in consciousness. This accords with Heidegger's view of *Dasein*, but not with the arguments of internalism or direct realism (a theory of perception, which argues that we have direct awareness of the external world through our senses). This is in contrast with indirect realism and representationalism, which posit that we are directly aware of only our internal representations of the external world. Dreaming is consistent with both internalism and direct realism, it mediates between our conscious awareness of the two views. The experience of dreaming may be brought about by the experience of docoherence in the REM sleep stage. As LaBerge (1990) states, "[i]n REM sleep, a spinal paralysis causes the muscles of locomotion and vocalization to fail to completely execute the action orders programmed by the brain. Thus, in REM, unlike the waking state, nothing impedes the brain from issuing sequences of motor commands at normal levels of activation, and this probably contributes to the experienced reality of dreamed action" (p. 123). Areas of the brain involved in network dreaming activity include medial temporal, medial prefrontal, midline, and parietal regions (Wamsley and Stickgold, 2010, R1012). Wigner's argument is that the existence of physical objects is useful to make sense of the content of consciousness. The content of consciousness is only accessible to the individual; therefore, other individuals are constitutionally equivalent to physical objects. Our embodied cognitions are independent yet have emergent physical and symbolic qualities and such symbolic qualities can be represented in dream episode memories which are sometimes available to conscious recollection.

Two well-known concepts of quantum mechanics that also provide insight about dreaming states are Heisenberg's uncertainty principle and (the analogy of) Schrödinger's cat. Heisenberg's (1927) uncertainty principle, in which it is impossible to say accurately both the location and velocity of matter on account of matter's simultaneous wave- and particle-like behaviour, finds parallel in the seeming impossibility of "locating a thought" in conscious experience within the brain — "thought" being a product of synaptic inter-relations distributed across a given area. Similarly, notions of entanglement and superposition (which inspire the analogy of Schrödinger's [1935/1983] Gedankenexperiment in which the cat in the box may be both alive and dead, or in any state in-between), also lend themselves to variations in the process of gating and non-gating of synaptic activity and, consequently, disconnections between form and substance, consciousness and unconsciousness in dreaming and waking states.

As Esfeld (1999) points out, when conducting quantum physics experiments concerning the collapse of the wave function as a result of the interaction between the object and the measuring instrument, there is entanglement between the object and the instrument. Consequently, the object is not in an eigenstate (a quantum state that is left unchanged after observation corresponding to a particular operator) of the measured observable. The measuring instrument does not indicate a definite numerical value of the observable. This is known as the measurement problem as it precludes the possibility of a reduction to an eigenstate of the observable.

Von Neumann (1963) extends this chain up to an observer. The observer's body and brain are entangled with the object and instrument. But if we take an observer into consideration, we end up with a description according to which the body of the observer, including her brain, is entangled with the instrument and object. The measurement problem can be formulated as the question of how a state reduction to one of the eigenstates of the measured observable can occur in this chain. Is there a way of explaining this link between classical and quantum worlds? The many worlds view argues that there is a wave function for the whole universe and no measurement problem as the position of each observer causes a branching into another world. The many minds view postulates a decoherence in which one quantum state is revealed in one of many possible minds and the universal wave function carries on evolving (Jackson, 2002). Such docoherence could also describe the experience of dreaming during the REM phase of sleep and the myriad states of consciousness and brain-wave functioning in waking states.

According to Esfeld (1999), using the Schrödinger equation, a possible solution to the measurement problem is that a state reduction is supposed to occur as an objective event in the physical realm before the von Neumann chain reaches the consciousness of the observer (a pre-measurement of quantum entanglement established between the system and observer achieving decoherence by interaction with the environment). However, the existence and entanglement of the observer changes the observation. It is not considered useful to assume that consciousness causes state reductions, yet the quantum state applies to all physical systems — the quantum mechanical physical reality needs to be reconciled with Newtonian physics. However, it may be possible to describe decoherence as coterminous with gating and non-gating synaptic functioning in the form of changes in distributed intelligence across brain functioning. Such decoherence might be a by-product of the ability to manipulate abstract symbols in the human mind in awakened states — as Markowitsch (2013) states, "[l]ong term storage of information has most likely a survival value" (p. 1). Such ability has evolutionary relevance.

People are prone to comprehend scale in terms of state reductions, as the classical realm with no entanglement may be the only way nature can appear

to human observers (Esfeld, 1999, p. 151). Yet from the theory of orchestrated objective reduction (Orch–OR) [Penrose and Hameroff, 2011], we know that this view doesn't capture how appearances come into being. The many minds theory offers a way out of this impasse that also accounts for phenomenon such as dreaming and memory. Quantum mechanics without state reductions describes the whole of physical reality by assuming that an observer has many minds, in which she abstracts from an entanglement what is objectively present (Jackson, 2002). If what is objectively present is filtered from a composite view by an awakened mind (or a mind in an awakened state of consciousness) a dreaming mind might process memories from a composite of recollections from a number of possible minds. As brain-wave functioning alters during REM sleep, memory recollection is reorganised as the result of the quantum state of such possible minds.

Von Neumann (1963) has suggested it requires consciousness at the point of measurement to collapse the wave function, given that the experimenter and that which is measured are all made of quanta. In the many minds theory, the process of decoherence, the collapsing of the wave function to produce one result, does not quantify at that measurement point alone, given that there is no necessary intervention by the consciousness of the observer. In this view there is no problem of measurement, because the experience of the observer does not contradict the quantum states. In one or an infinity of possible minds, the wave function predicts a yes and no, and all the probabilities in between (Jackson, 2002). Fluctuations in the wave function during dreaming states may result in the entangled recollections of dreaming.

This does not contradict the role for consciousness in classical experiments where outcomes are thought not to be dependent on the observer. Again, to state a paradox, such outcomes could not be known without the presence of an observer. Perhaps it is better to view this as one form of measurement (classical) working towards the outer limits of the exclusion of consciousness, and the other form of measurement (quantum) to the inner limits of inclusion. Dreams could then be described as spatio-temporally coherent fragments of conscious experience that emerge from memory recollection in REM sleep resulting from (quantum) changes in brain-wave function.

For von Neumann (1963), everything is regarded as being quantum, including the brain of the observer, which corresponds to a mentalistic and positivistic view of reality, a view which may be recollected in dreaming states. Von Neumann found that only consciousness could hold the privileged immaterial position in which consciousness is not part of the physical universe but is res cogitans. Wigner (1964) argued that the consciousness of the observer led to a collapse of wave function, and the reduction of probability into a measurement which Bohm (1990) postulated implied both an implicate and explicate order in the space–time quantum. Changes in brain state might also be coterminous with the collapse of wave function, evidenced for example in the "distorted lucidity" of recalled dreaming

states. The conscious perception or experience of a brain state unfolding in consciousness is a substrate for all reality, while the latter (the dreaming state) is a non-conscious but recalled experience of space and time unfolded from implicate order. It is the task of the conscious mind to provide explicate order to the events and perceptions about which it is involved. Acceptance that all is made of quantum stuff does not necessarily entail that consciousness is res cogitans, but that it is a different order of thing.

As Jackson (2002) points out, the orthodox view of the probabilities of quantum physics suggests that the electron's indefiniteness is transferred to the measuring apparatus, but, at the collapse of wave function, the measured state goes into the eigenstate corresponding to the result obtained. The many minds view also assumes that the entire universe has a quantum state. As Jackson (2002) explains, this quantum state is a superposition of states corresponding to many different macro realms, where all realms are actual: "The idea is that the world splits at each measurement, like a tree into branches, with 'daughter' worlds for each result" (p. 14). Consequently as the sleeping mind oscillates between patterns of NREM and REM sleep, dreaming (and conscious recollection of dreams) may occur as a consequence of quantum fluctuations in brain states.

However, the question then becomes, if all of the realms are actual, then why can't we see them? The many worlds theorists argue that after splitting, these realms have no access one to another. However, during REM sleep the mind may temporarily recollect fragments of dream memories of the perceptions which might represent possible quantum shifts. Dreaming states are relevant because each of the many minds representing different probabilities of the eigenstate may not be entirely closed to one another. There will be probabilistic traces of the other in each, and these traces collectively represent a measure of reducible memory trace processed during sleep.

The many minds theory poses a difficulty for the Cartesian in that there is no sharp distinction between subject and object. As Bilodeau (1996) reasons, our analytic habits are more to do with how our minds appear to function to us than any necessarily direct natural correspondence. It may be that our notion of the workings of a physical substrate needs to change as we register the shift in our comprehension of our experiences within classical and quantum worlds. Yet there are as yet no precise experimental coordinates to the end-point of this objective. Bilodeau argues that phenomenal consciousness offers an inconsistency in the way we are capable of perceiving our world (such an inconsistency might be found in the recollection of dreaming states). However, this dividability into properties and spatial relationships may be entering its final phase. This is known as the "hard problem." To transcend the hard problem we need a non-classical ontology, which is neither physicalism (everything which exists is no more than its physical properties), idealism (the only things knowable are

the contents of consciousness) or dualism (mental phenomena are non-physical properties of physical substances).

As Bilodeau (1996) points out, we cannot necessarily expect that the qualia of the mind are of the same order as that which produces the mind. There is more to mind's relationship to the quantum world than epiphenomena superimposed on patterns of information processing. Rather, in the many minds theory, each possible eigenstate is correlated with at least one mind. Each mind sees an outcome in the classical world, yet does so containing the possibilities of other minds. Yet as each mind sees an imprint of possibility of the other, distinguishing between minds is not the same as distinguishing between possibilities, as there may be many millions of possibilities for any given mental state. It is possible that dreaming results as the ephemera derived from the complex processing or fluctuations between possible states of the mind during sleep.

Squires (1998) has argued that since quantum physical equations do not contain what we observe, they are either wrong, or new equations are needed. If we take Squires as correct at the representational level, then Squires and we need to add non-linear elements to the Schrödinger equation to account for all the effects of wave function collapse. Because stochastic or non-determined processes are involved in quantum physics, a random white noise process may be identified in the modified Schrödinger equation. This random white noise may theoretically register the imprint of dreaming in the quantum mechanical view; it carries the trace of the individual eigenstate of many possible minds. As Jackson (2002) points out, instead of proposing an infinity of worlds, we could ascribe every sentient being with a continuous infinity of simultaneous minds, which differentiate over time. In this understanding, one mind per person is expressed as a kind of multi-mind. In this many minds theory, dreaming is the cumulative effect of the recognition of one mind to the other which may result in the noise that manifests as dreaming states when sleeping — and also potentially the imagination when waking. A dream is an echo of a frame of meaning, which may have many versions of reality, yet upon waking the strongest frame gets selected. When dreaming, people lose the accuracy of the memory recall because they have little sensory visual imagery with which to test reality. For Tulving (1985), autonoetic (self-knowing) and noetic (knowing) consciousness are relevant. Autonoetic consciousness, or the awareness of personal time including the past and the future, is characterised by retrieval from episodic memory (i.e., personally experienced events), while noetic consciousness, or learned knowledge that is accompanied by personal awareness, is retrieved from semantic memory. Or there may be separate retrieval processes of differing strength levels along an undifferentiated dimension which relate to different underlying memory systems (Selmeczy and Dobbins, 2013, p. 66).

Why do people only remember dream episodes versus full narrative experiences? As Lee (2010) remarks, "[l]ack of dream recall [as full narrative memories] suggests

the modern emphasis on the significance of waking realities at the expense of oneiric experiences" (p. 288). It is not simply that natural selection has pre-conditioned us to dismiss dreams on waking but that the cognitive states of dreaming are suppressed on waking experience; as Lee (2010) also states "dreaming constitutes an unbroken chain of memory to the organisation of everyday life" (p. 288). It is rare that memory can provide unproblematic access to detailed aspects of any particular dream. Dream recall is effected during sleep, and the ability to recall dreams is most active during the REM phase of sleep. But dream recall and memory in both traditional and modern cultures are regarded as continuous with conscious experience in the waking world (Lee, 2010, p. 293). The memory of dreams in a waking state, that Freud termed day "residue" — acknowledges the fact that memories of previous dreaming experience can effect and have a delayed reaction on conscious cognitions. However, Freud's symbolic language of dreams was eclipsed by the activation–synthesis hypothesis of Hobson, McCarley, and Wyzinski (1975) which was a neuroscientific account of dreaming that posits that dreams originate from neural signals in the brainstem generated during REM sleep. For Hobson et al. (1975), dreaming occurs when a sleeping brain attempts to process that chaotic input into its "higher-level cortical circuitry" but it can also occur in non-rapid eye movement sleep (Wamsley and Stickgold, 2010, R1010).

As Nielsen and Stenstrom (2005) observe, remembered dreams only very rarely portray complete episodes — this occurs in only 1.4% of reports, whereas in another study, up to 65% of incomplete episodes of dream elements were linked to waking events (p. 1286). However, in negative dream states such as nightmares, dream imagery is episodic. As they state, a traumatic event may be replayed as a group of "isolated spatio-temporal, perceptual and emotional details which may or may not preserve autonoetic" (self-in-time) awareness (p. 1286). However, it is clear that (like some forms of imagination) dreams simulate reality insomuch as they take place in spatially coherent environments, in which a self-interacts perceptually. There is orientating sensory information, and a sense of self which engages in emotional and intellectual exchanges. Consequently, the spatial and temporal valences that signify dreaming are coterminous with the spatio-temporal binding that characterises consciousness (Nielsen and Stenstrom, 2005, p. 1287).

There is a consensus forming amongst some theorists that altered hippocampus function during sleep accounts for the episodic dream memory and that hippocampal changes (or activity of the hippocampus, entorhinal cortex and other parahippocampal regions) contribute to the characteristics of dream content (Nielsen and Stenstrom, 2005, p. 1286). Thus, when sleeping but in a dreaming state, the perception of a dream as occurring in the here and now may or may not correspond to the spatio-temporal location of the dream. This in itself might occur in parallel with other functions such as narrative organisation, and could occur on the threshold of consciousness and thus be self-observable by both dreamer and awakening sleeper (Nielsen and Stenstrom, 2005, p. 1287). Such experience at the "threshold of

consciousness" could be understood in quantum terms. The hippocampus is responsible for both temporal and spatial patterns (specifically the presubiculum regions). However, the emotional sources of dreaming are regulated by the amygdala which controls encoding and the retrieval of emotional memories and physical expression (Nielsen and Stenstrom, 2005, p. 1288). Amygdala activity raised during REM sleep rather than during wakefulness maintains a reciprocal dependence with hippocampus in storage of memories — amygdala gates sensory information through the entorhinal cortex (Nielsen and Stenstrom, 2005, p. 1288). The cognitive-level replay that is characteristic of dreams corresponds to reduced levels of acetylcholine in NREM sleep or quiet wakefulness and is believed to result in the consolidation phase of episodic memory, producing information flow from the hippocampus to the entorhinal cortex (Wamsley and Stickgold, 2010, R1012).

Although it is apparent that there is a link between memory and dreaming, there is as yet no causal linkage. However, when an integrated episodic memory is experienced during waking, information may flow from the hippocampus to the cortex — such hippocampal outflow is blocked during REM, with neural information flowing from the cortex to hippocampus (Fosse, Fosse, Hobson, and Stickgold, 2003, p. 6). Dreaming during REM sleep results in the suppression of brain chemistry which registers stress, and difficult emotional experiences may be processed which results in the ability to recall difficult memories without trauma (Barnett, 2012, p. 9) Thus dreams may help to emotionally regulate traumatic experiences. As Wamsley and Stickgold (2010) state, dreaming is:

> . . . the product of a mind that is constantly encoding and processing information about the world. When sensory input is at a minimum, newly formed memory traces are stabilized during offline states of quiet wakefulness and sleep, through the repeated reactivation of experience-related activity patterns. During sleep, this reactivation of memory traces contributes to the imagery, thought, and narrative of dreaming. (R1013)

Both REM and NREM sleep are involved in the consolidation of different forms of memory. Consequently, dreaming is "influenced by the retrieval of recent memories in the sleeping brain" (Wamsley and Antrobus, 2009, p. 283). Thus dreaming states may be "quantum, trace, or ghost visions" of the disorganised contents of recent recollected memories, undergoing re-organisation in the brain. However, while the relationship between memory and conditioning is not clear, what is clear is that the hippocampus plays a role in the acquisition and retrieval of fear conditioning in animals; but conditioning itself may be distinct from human cognitive memory as it produces a far stronger physiological and behavioural response. As Wamsley and Antrobus (2009) assert, "hippocampus-dependent learning can be reactivated and expressed during human sleep, effecting the emotional quality of experience" (p. 289). Thus, for Walker (2005), given current understanding of the neurophysiological substrates of memory forming and consolidation, "we are able to move away

from the question of whether sleep is the key factor responsible for memory formation, and instead, begin disentangling certain confusions around the argument of exactly what type of sleep is or is not required with regard to discrete stages of memory development" (p. 64). It stands to reason that the plethora of sensory stimuli received in the course of wakefulness will require periods of relative cessation in order to be processed into schema that are memorable and those that are commonplace and can be discounted from conscious recollection. Tononi and Cirelli (2005) argue that the benefits of sleep, including performance enhancement, are associated with synaptic downscaling as a continuation of the homeostatic regulation of slow wave activity (p. 85). Such wave activity may also be analogous to a reduction in quantum fluctuation in the "many minds" theory. If it were possible that dreams are thus recalled fragments of memories at the cusp of changes in quantum states in consciousness during REM sleep, this also may lend credence to the idea that problem-solving as a part of schema processing can be accomplished while asleep. The human brain may itself be a form of quantum-computer.

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Higher-Order Thoughts and the Unity of Consciousness

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Rosenthal is perhaps best known for his higher-order thought theory of consciousness, but he has also expanded his theory to account for the unity of consciousness. His account posits two distinguishable mental mechanisms. I argue that, although both mechanisms may serve to unify consciousness in certain ways or to some degree, they are not sufficient to account for all of the different ways in which consciousness is unified. Thus, Rosenthal's account fails as a general account of conscious unity.

Keywords: Rosenthal, higher-order thoughts, conscious unity

Most of the time our attentions are directed outwardly at the world around us and not on our inner, experiential lives. Our conscious experiences are ever present and, for many, a mundane feature of existence. But conscious experience is a rich and multi-faceted phenomenon. For the curious and reflective, it is a seemingly limitless object of study. In recent decades, we have been presented with numerous examples of subjects whose experiential lives appear to be markedly different than our own. When we contemplate what it might be like to be one of these subjects, it becomes apparent that our own experience is unified in ways that we were previously unaware of or deemed entirely unremarkable. And once we suspect that certain features of our experience may not be ubiquitous, we look for an explanation. What is responsible for the unity of consciousness?

A fair bit of work has been done cataloguing the different kinds of conscious unity, but work on attempting to uncover the mental mechanisms responsible for them is still in the early stages. Rosenthal is most known for his higher-order thought (HOT) theory of consciousness, but he has also extended his theory to account for conscious unity. This essay is a critical examination of Rosenthal's account. I will argue that it fails as a general account of conscious unity. The discussion will focus on Rosenthal's account, but it will have broader implications.

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One need not be a higher-order theorist to be tempted to use elements of Rosenthal's account to explain conscious unity. Many of my criticisms will apply whether those elements appear within the context of a higher-order theory of consciousness or not.

The essay will begin with a brief discussion of some different kinds of conscious unity and a presentation of Rosenthal's account. The critical portion of the essay will begin with a discussion of some general, but important, questions Rosenthal fails to address. It will then turn to an examination of the two mental mechanisms Rosenthal invokes to explain conscious unity and it will argue that there are some kinds of conscious unity for which neither mechanism is able to account. The essay will conclude with a brief discussion about how Rosenthal's account of conscious unity presupposes the same kind of representational mismatches that some have argued pose a serious problem for higher-order theories of consciousness.

The Unity of Consciousness and its Many Forms

Reflection on the nature and structure of conscious experience reveals that experience is unified in a number of different ways. Some forms of conscious unity apply to simultaneous (synchronic) conscious states. Others apply to states that are conscious at different times (diachronic). Perhaps the most fundamental kind of synchronic unity is *phenomenal unity*. A number of experiential states are phenomenally unified when they are experienced together as part of a single overarching or global experience at a time Tye (2003). My current experience, for example, is a complex one. I have a visual experience of my computer monitor. I hear music playing in the background. I can feel the chair pressing into my back and the keyboard beneath my fingers. I can taste the remnants of my last sip of coffee. Each of these experiences is independent of each other in the sense that it would be possible to have any one of them without the others. To use Nagel's (1974) well-known terminology, there is "something it is like" to see my computer monitor, and there is "something it is like" to hear music playing. But there is also "something it is like" to see my computer monitor while hearing music. The latter experience encompasses the former. When a number of experiences are encompassed by a larger experience in this way, they have a conjoint phenomenology. Theorists have used a variety of terminology to refer to this relation. Parfit (1984), Lockwood (1989), and Dainton (2000), for instance, say that such experiences are "co-conscious." Bayne and Chalmers (2003) and Bayne (2008, 2010) say that such experiences are "subsumed" by the experience of which they are both a part.

Another kind of synchronic unity is *spatial unity*. Under normal circumstances, and with correctly functioning sensory systems, the objects we perceive via our senses are given to us as spatially related to each other. They appear as located within a three-dimensional phenomenal space. Kant famously argued that this kind of spatial integration is a necessary feature of experience. Dainton (2000, ch. 3), drawing on some scenarios described by Dennett (1978), has challenged this claim.

Suppose a team of scientists gain complete control over my sensory inputs. Suppose they give me a visual and auditory experience of a beautiful mountain vista accompanied by birds singing in some nearby trees. And suppose they give me a tactile and somato-sensory experience of swimming under water. What would the nature of my experience be if I were then given the sensation of scraping my shin against a sharp underwater rock? It is conceivable that the rock and the mountain would not be perceived as inhabiting a single three-dimensional spatial field and, hence, as not being spatially related to each other. A less fanciful example involves a common experience among the tall buildings in large urban centres. I often find that, upon first hearing the siren of an emergency vehicle, I cannot tell where it is coming from. Eventually its location becomes clear — or at least it becomes clear where the sound seems to be coming from — but there is a period of time where its location relative to other objects in my sensory field is decidedly unknown.

A third kind of unity, *object-unity*, involves the way we perceive objects (Bayne and Chalmers, 2003; Tye, 2003). As I look at the coffee mug sitting on my desk, I perceive redness and cylindricality. What is noteworthy about my experience is that it is of a single object in which cylindricality and redness both inhere. I do not, for instance, experience redness as belonging to one object and cylindricality as belonging to another, even though it is possible to have an experience in which this is the case — imagine gazing at a red cube beside a blue cylinder. What is remarkable about this kind of experience is that the different visual properties of objects are detected by different parts of our visual system and in different regions of the brain before coming together in a single visual experience of a complex object. Attempts to explain this phenomenon have come to be known as solutions to the binding problem (Roskies, 1999; Treisman, 1999). The literature on this subject contains many examples of binding failures, many of which involve "illusory conjunctions" of the colors and shapes of the objects in a stimulus. These illusory conjunctions have been elicited in normal subjects (Treisman, 1998; Treisman and Schmidt, 1982), but there are also documented cases involving subjects suffering from certain kinds of brain damage who experience these illusory conjunctions in a more persistent way (Coslett and Lie, 2008; Treisman, 1998; Ward, Danziger, Owen, and Rafal, 2002). The binding problem, as it is commonly known, concerns the visual system and visual perception. As such it concerns a kind of *intra*-modal object-unity. But our experiences of objects often draw from a number of different sensory modalities. If I hold my hand near the mug, I feel its warmth. If I pick it up, I sense its weight. I perceive not only cylindricality and redness as inhering in it, but also warmth and heaviness. Thus, object-unity can also be *inter*-modal.[1]

[1]My object-unified experience with respect to my coffee mug is a kind of synchronic unity. But it seems as though object-unity can also be a diachronic unity, depending on the nature of the perceived object. A melody, for instance, is a temporally extended perceptual object; in order for a number of notes to be heard as a melody they must be heard in succession. If it is coherent to think of a melody as a perceptual object, then our experience of musical melodies involves a kind of diachronic object-unity.

Phenomenal unity and spatial unity are paradigm examples of synchronic conscious unity. A paradigmatic kind of diachronic unity is *stream-unity*. My current global experience is part of a temporally extended episode of consciousness that began when I awoke this morning. The same is true for each of the momentary conscious states I enjoyed along the way. Together, they form a stream of consciousness. Whenever a pair of momentary global experiences are part of the same temporally extended episode of consciousness in this way, they are stream-unified.

A slightly different kind of diachronic unity involves our ability to ascribe our own mental states to ourselves. For instance, I can think of the experience I have as I reach for my coffee mug as my own. I can do the same for experiences I had in the past. Any pair of experiences that I self-ascribe in this way are *subject-unified*. There is a vast literature, both in philosophy and psychology, about the ability to self-ascribe mental states and the relation of this ability to self-knowledge and personal identity. Inevitably, these discussions wade into metaphysical and epistemological questions about the nature of the "self" and of what a subject of experience is. There are nearly as many opinions about these questions as there are theorists writing about them. I do not want to take up these disputes here except to say that the concept of a subject of experience that I will be working with in the following pages is relatively minimalist in nature. Any being that has conscious mental states counts as a subject of experience. And whether or not that individual has the capacity to self-ascribe mental states will depend on having certain concepts and cognitive capacities. An individual may have the ability to self-ascribe a mental state even if it lacks, in colloquial terms, a "personal identity" or the ability to tell any sort of social and personal narrative about herself. There are additional kinds of conscious unity, but this list will provide an adequate place from which to start.

Rosenthal's Account of Conscious Unity

Rosenthal's (2003, 2005c) account of conscious unity is an extension of his higher-order theory consciousness (1986, 1997). Higher-order theories of consciousness make conscious experience a matter of representation; a mental state, m_1, becomes a conscious mental state when its subject is in a mental state, m_2, that represents m_1 in the appropriate way. Some, like Carruthers (1996, 2000) and Rosenthal, maintain that the representing (higher-order) state, m_2, must be thought-like in nature. Others, like Armstrong (1968, 1981) and Lycan (1987, 1996), maintain that m_2 must be perception-like in nature. Most higher-order theories maintain that the (lower-order) represented state, m_1, and m_2, must be numerically distinct. Kriegel (2009), however, has defended a one-state higher-order theory according to which a mental state becomes conscious when it represents *itself* in the appropriate way (i.e., m_1 and m_2 are the same state). Another kind of higher-order

theory, defended by Brown (2014), eschews the relational aspect of traditional higher-order theories and posits that conscious experience is just the product of being in a mental state that has higher-order content. Rosenthal's HOT theory, as a general theory of conscious experience, will be considered in the final section. Here my focus will be on the elements of his theory that are important for his account of conscious unity.

At any given time during our wakeful hours we are in numerous conscious states. Every conscious state is accompanied by a HOT that targets it. The atomistic nature of this theory, says Rosenthal, "may seem to prevent it from being able to explain our sense of the unity of consciousness. If each conscious state owes its consciousness to a distinct HOT, how could we come to have a sense of such unity?" (2005c, p. 340). How is it that "all of our conscious states seem to belong to a single, unifying self?" (p. 340).

Rosenthal answers this question by maintaining that HOTs "operate on many of our mental states not singly, but in large bunches" (2000, p. 226). They target and represent many different mental states all at once. Consider the well-known cocktail party effect. Cocktail parties are often noisy, with numerous conversations going on all at once. In spite of this, the mention of one's name in a conversation across the room is often enough to draw one's attention to it. If one's name were mentioned in a different conversation, it would have the same attention-grabbing effect. But we do not hear the many conversations as articulated conversations. Rather, we hear them as a background din. What this suggests, according to Rosenthal, is that "one's HOTs group many auditory sensations together, making them conscious only as an unarticulated bunch" (2000, p. 227). A single HOT can make a number of mental states conscious all at once, and conscious lower-order states become unified when they are all represented together by a single HOT.

Co-representation at the higher-order level, however, cannot account for conscious unity by itself.

> Wholesale operation of HOTs . . . doubtless helps to induce some conscious sense of unity among our mental states. But that will only go so far. Since no single HOT covers all our conscious states, the basic problem remains. How can we explain a sense of unity that encompasses states made conscious by distinct HOTs? (2005c, p. 342)

Co-representation at the higher-order level cannot account for the sense of conscious unity by itself, because if no single HOT represents all of one's conscious lower-order states at once, there will always be at least one pair of lower-order states that are not subsumed by the same HOT.

In response to this problem, Rosenthal presents another feature of HOTs that serves to unify experience. A HOT is a thought that ascribes a mental state to an individual. It is a thought with a content of the form "I am in such and such a mental state." It ascribes a mental state to an individual by referring to the subject of that mental state via the reflexive indexical "I." This gives the owner of the

HOT the sense that she is directly aware of the subject of the HOT's target state. Because HOTs refer to the subjects of their target states indexically, their contents are "bare" with respect to the way in which they characterize those subjects. HOTs do not refer to those subjects via descriptions. This means that HOTs do not differentiate the bearers of their target states in any way. Nothing about the mental "I" by itself gives any information about its referent. So nothing in the content of a HOT indicates, by itself, that the bearer of its target state is the same as or different than the bearer of another HOT's target state. This, according to Rosenthal, facilitates a certain kind of subjective impression in us. "[O]ur seeming to be aware in a direct and unmediated way of the self each HOT refers to tilts things towards apparent unity. Since we seem to be directly aware of the self in each case, it seems subjectively as though there is a single self to which all of one's HOTs refer, a single bearer for all our conscious states" (2005c, p. 344).

Thus, Rosenthal offers a kind of two-pronged account of conscious unity: conscious unity is due in part to the fact that HOTs often co-represent multiple lower-order states at once and in part to the fact that they seem to ascribe their target states to a common subject. In what follows, I will refer to these two aspects of Rosenthal's account as the *co-representation mechanism* and the *common-ascription mechanism* respectively.

Refining Rosenthal's Account

Rosenthal's account of conscious unity gives rise to several immediate questions. The first has to do with the fact that there are many different kinds of conscious unity but only two mental mechanisms to do the unifying work. How are we supposed to understand the explanatory domains of these two mechanisms? The second has to do with the co-representation mechanism. What, precisely, is the content of a HOT when it collectively represents a number of lower-order states? The third has to do with the common-ascription mechanism. Can direct reference by itself serve as a unifying mechanism? None of these questions raises insurmountable problems for Rosenthal's account, but they reveal important issues that he does not address directly.

Unities and Mechanisms

Rosenthal introduces a few kinds of conscious unity, but when the discussion turns to offering an account of conscious unity the plurality of conscious unities disappears from the picture. One is left with the sense that the explanandum is a single homogeneous property and that it is conscious unity per se that is being explained rather than one or other specific kind of unity. One is also left with the sense that the explanans, i.e., the co-representation mechanism and the common-ascription mechanism, work in a cooperative fashion to produce conscious unity. These ways of conceiving the explanandum and the explanans are both problematic.

Conscious unity as a homogeneous mental property. Consider, first, the explanandum. The different forms of conscious unity vary greatly in nature and character. Perhaps the most significant structural difference between them is that some of them are synchronic and others diachronic. Whichever mental mechanisms produce the several kinds of synchronic unity, their effect on a subject's overall experience at a time is profound. For instance, if a pair of mental states are phenomenally unified, they are part of the same global experience. If not, then not. Nothing, it would seem, would have a bigger impact on what a subject's global experience is like at a time than which mental states are part of that experience. The phenomenal impact of object-unity is almost as dramatic. I am currently experiencing my coffee mug as cylindrical in shape, red in colour, and warm to the touch. If my sensory systems were not functioning properly and I did not experience redness as belonging to the object that is cylindrical and currently warm to touch, my present experience would be very different. The mechanisms responsible for the different diachronic unities, on the other hand, seem to have a comparatively small impact on the phenomenology of one's experience at a time. For instance, the first visual experiences I had this morning are stream-unified with the visual experiences I have now. And even though these visual experiences are stream-unified, the fact that they are stream-unified has little or no bearing on the overall character of my present experience. I could have had very different visual experiences when I woke and have had qualitatively identical visual experiences now. Or consider subject-unity. If I ascribe a (past or present) mental state to myself, I introduce a phenomenological component to my present experience — having a conscious thought is phenomenologically different than having the same thought unconsciously — but having a conscious thought does not dramatically effect the overall character of my experience. Synchronic and diachronic unities vary greatly with respect to their impact on the phenomenal character of present experience.

These differences between the kinds of synchronic and diachronic unity are important for two reasons. First, they reinforce the point that conscious unity is not a homogeneous mental property. Conceiving of the explanandum of a theory of conscious unity in this way is misguided. Second, and more important, these differences make it prima facie doubtful that only two mental mechanisms are responsible for them all. As the above discussion has made clear, some kinds of conscious unity have a much greater effect on the overall phenomenal character of one's experience at a time than others do. This already suggests different mechanisms. What also suggests differences in mechanism is that these different kinds of unity are conceptually independent of each other and, in some cases, have been empirically demonstrated to be independent of each other. For instance, one kind of unity (phenomenal unity) has to do with how all of the phenomenal properties one experiences at a given time are experienced together in a single encompassing experience. Another kind of conscious unity (object-unity) has to do with how a variety of different phenomenal properties get bound together into a single percept of a complex object. As was pointed out above when the concept

of object-unity was introduced, research on the binding problem has produced numerous documented failures of object-unity. But these failures of object-unity seem to occur without producing simultaneous failures of phenomenal unity. Likewise, failures of object-unity can occur without failures with respect to subject-unity. Binding failures, for instance, can occur without those experiencing the failures also attributing their mental states to different subjects. Of course, merely pointing to the many ways that different kinds of conscious unity seem to be able to come apart does not demonstrate that it is *impossible* for one or two mental mechanisms to be responsible for all of them, but it does introduce doubt about the adequacy of any account like Rosenthal's that seems to posit a one–many ratio of mechanisms to unities.

Rosenthal has at least one theoretical resource at his disposal that may help to blunt this worry. The co-representation mechanism contributes to conscious unity by representing multiple lower-order states in a single higher-order representation. Rosenthal is largely silent about the details of this kind of collective higher-order representation, but there is nothing in principle that should prevent him from exploiting collective representation in different ways. He could maintain, for instance, that it is not only the fact that multiple lower-order states can be co-represented by the same HOT that contributes to conscious unity but also the way in which they are co-represented. Later I will argue that mere co-representation is not enough to account for conscious unity, but that the higher-order representations must also represent certain relations between lower-order states and their contents. Nothing prevents Rosenthal from accepting this claim. He could maintain that conscious states are unified in one way in virtue of a HOT representing them as related in a certain way, while conscious states are unified in another way by virtue of a HOT representing them as related in a different way. This would also be consistent with the way in which Rosenthal conceives of the function of HOTs in other writings; HOTs, he says, often "play a partially interpretive role" (2005b, p. 211). Dental patients, for instance, can experience the vibrations of the drill together with their own fear as pain. If they are told that the relevant nerves have been anaesthetized, this can often change their experience.

It is doubtful that experiencing vibration and fear as pain is just a matter of a HOT representing certain *relations* between the lower-order sensory states. But what this shows is that Rosenthal grants HOTs a significant degree of representational license, and this may provide Rosenthal the theoretical space within which to develop an adequate response to the above worry. This may be a way for Rosenthal to address the apparent disparity between the number of different kinds of conscious unity and the number of mental mechanisms available to account for them, but for the moment I will set it aside and consider another worry about the way in which the mental mechanisms seem to be presented in his account.

Cooperating mental mechanisms. What is clear from Rosenthal's account is that the co-representation mechanism and the common-ascription mechanism each

have a role to play in producing conscious unity. What is less clear, however, is exactly how the two mechanisms work together or play off of each other to perform this role. What are their respective explanatory domains? Are their explanatory domains completely distinct so that each mental mechanism has its own species of conscious unity to account for? Or do their explanatory domains overlap partially? That is, are there some kinds of conscious unity for which both mechanisms are together responsible and others for which one or an other mechanism independently accounts for? Or, finally, do their explanatory domains overlap completely? Although Rosenthal does not address these questions explicitly, it is possible to read him as endorsing the view that the two mental mechanisms have largely, if not completely, overlapping explanatory domains. There are a number of problems with this view.

First, just as the different species of conscious unity vary greatly in nature and character, so do the mental mechanisms of co-representation and common-ascription. Though both crucially involve the representational contents of higher-order states, they are associated with different aspects of those higher-order contents. In the latter, unity is achieved as a result of the way in which higher-order states refer to the individuals to which their target lower-order states are ascribed. In the former, unity is achieved as a result of the fact that higher-order states represent the contents of their target states. Referring to an individual is a very different kind of thing than characterizing the contents of mental states. There is no antecedent reason to believe that these very different aspects of HOTs and their contents would be associated with the same or similar unifying functions. Thus, there is reason to be suspicious of an account according to which the different mental mechanisms involved in unifying consciousness would each be partially responsible for each of the many different species of unity.

Second, if the explanatory domains of these two mechanisms overlap in this way, additional questions arise about how this is to be understood. Select any arbitrary kind of conscious unity. Are both mechanisms *necessary* for it to obtain? If one of the mental mechanisms were absent, would the conscious states fail to be unified in the relevant way? Or conversely, is the relevant kind of conscious unity causally overdetermined by the two mental mechanisms such that each mental mechanism is *sufficient* to produce the relevant kind of conscious unity on its own independently of the other, entailing a kind of causal redundancy?

Both of these scenarios are problematic. Suppose both mechanisms are necessary to produce a given kind of unity. We can then ask what it would be like for a subject in a situation in which only one of the mental mechanisms was operational? Would the subject's experience be merely partially unified in the relevant way or would it fail to be unified at all? If the latter, we are left to wonder what the causal role of the remaining mental mechanism is. If the former, can we make sense of a scenario in which a given sort of conscious unity only partially obtains? I will argue that we cannot. For many of the different kinds of

conscious unity we have been presented with, the notion that conscious states can be partially unified along any of these different dimensions seems incoherent.

Take phenomenal unity as an example. Is there any sense that can be made of a situation in which a number of conscious states are partially phenomenally unified? This question has been debated extensively in the literature on split-brain patients. Split-brain patients are individuals who have had their corpus callosum surgically severed. The experimental data suggest that the two hemispheres of the upper brain in these patients do not receive the same sets of sensory information. For instance, if an object is shown to the left hemisphere, the patient is able to identify it verbally — language is a left hemisphere function — but not manually with the left hand — motor control of the left hand is a right hemisphere function. The opposite happens if the object is shown to the right hemisphere. This has led to speculation about what the experiential lives of these patients are like. Dainton (2000) and Bayne (2008, 2010) argue that the patients have a single experiential field or stream of consciousness. Others, like Sperry (1968, 1984), Puccetti (1981), Marks (1981), Tye (2003), Koch (2004), and Schechter (2012) express varying degrees of sympathy for the view that they have two (non-overlapping) experiential fields. On this view, there may be a large degree of qualitative similarity between the two fields at any given time, but none of the conscious states in one experiential field or sphere is token-identical to any conscious state in the other. Thus, neither of these views interprets the overall phenomenal field of a split-brain patient as being partially unified.

To my knowledge, Lockwood (1989, 1994) is the only theorist to defend the view that split-brain patients have two partially overlapping fields of experience. This amounts to the claim that it is possible for a pair of conscious states, c_1 and c_2, to be parts of single global experience and for the pair, c_2 and c_3, to be parts of a single global experience without, at the same time, the pair, c_1 and c_3, being parts of the *same* global experience. The main criticism of Lockwood's view has been that it seems to be incompatible with any plausible way of understanding what it means for a pair of conscious states to be part of the same global experience or for them to have a conjoint phenomenology (Bayne, 2008, 2010; Dainton, 2000). The relation of having a conjoint phenomenology is a phenomenal relation. The only access we have to it is through our own experience, and it is extremely difficult, if not impossible, to conceive of a scenario in which the relation is instantiated in the way Lockwood suggests. Although Lockwood has gone to some length to defend the partial-unity interpretation of the split-brain data, he has himself expressed doubts about its coherence (1994, p. 95). If we cannot make sense of a situation in which conscious states are partially phenomenally unified, then we have reason to be skeptical of any account that suggests phenomenal unity is produced via a pair of mental mechanisms such that one of the mechanisms would produce a partially phenomenally unified experience in the absence of the second mechanism.

Dividing the unifying labour between a pair of mental mechanisms in this way is problematic with respect to phenomenal unity. What about some other kinds of unity? Subject-unity, for instance, also appears to be an all-or-nothing phenomenon. What could it mean for a pair of mental states to be partially subject-unified? It is certainly possible for a subject to self-ascribe c_1 and c_2 and to ascribe c_3 to another subject. But this is a situation in which c_1 and c_2 are subject-unified and the pair, c_2 and c_3, is not. This is not a situation in which the trio, c_1, c_2, and c_3, is partially subject-unified. The same will be the case with respect to stream-unity. For any pair or trio of conscious states, they will either all be part of the same stream of consciousness or not. If they are, then they are stream-unified. If not, then not. There does not seem to be any way to understand what it would mean for them to be partially stream-unified. Thus, the view that two mental mechanisms can each partially, but not completely, unify a subject's conscious states along any of these dimensions of conscious unity is problematic, because, in many cases, conscious unity seems to be an all or nothing proposition.

What about the alternative? What about the view that each of the two mental mechanisms is independently sufficient to produce any given kind of conscious unity? This view is also problematic because it amounts to the view that the two mental mechanisms causally overdetermine the different kinds of conscious unity? And this seems implausible in the face of the above considerations about the very different natures of the mechanisms. It also entails a rather significant resource cost, for it would entail that there are at least two independent mental systems doing the very same unifying work at any given time.

It is not exactly clear from Rosenthal's account how he conceives of the division of labour for the two mental mechanisms responsible for conscious unity. It is possible to read him as endorsing the view that they have overlapping explanatory domains, but for the above reasons, this view is problematic. An alternative view, according to which the two mechanisms have completely distinct explanatory domains, avoids these worries. Although it is possible to read Rosenthal as endorsing the overlapping view, nothing he says is directly inconsistent with the alternative view and so he would be free to accept it. The task would then be to provide more details about which kinds of conscious unity each mental mechanism is responsible for.

Mere Conjunctive Co-Representation

Part of what unifies conscious states, says Rosenthal, is the fact that HOTs often represent many lower-order states all at once. This invites a question about what these collective higher-order representations are like. Rosenthal has little to say about the precise nature of these higher-order representations. What I will argue here is that these collective higher-order representations must satisfy a certain condition.

Consider object-unity. The notion that object-unity might be the product of the co-representation mechanism has a high degree of plausibility. We know that

our perceptual systems are modular in nature. Their representational contents at any given time will represent the particular physical properties they are respectively attuned to. What better to produce a unified experience of a single object from the disparate contents of these perceptual modules than a higher-order representation that incorporates them all into a single representation? It is important, however, that such collective higher-order representations are not merely conjunctive representations of the lower-order contents.

Suppose an object has a number of properties and that two of these properties, X and Y, are associated with distinct perceptual modules specialized to detect them. One way in which the contents of these perceptual sub-systems could be co-represented by a HOT would be in a merely conjunctive manner. Such a HOT would have a content like the following: "I am in a mental state that represents that something is X and in a mental state the represents that something is Y." This content is consistent with having a perception of a single object that is both X and Y, but it is also consistent with having a perception of two objects, one of which is X and the other Y. Merely appearing together in the same higher-order content is not enough to guarantee an experience in which X and Y inhere in the same object. What would seem to be required would be for the HOT to represent some kind of relation between X and Y or for the HOT to represent that they are instantiated by the same particular. The former could be achieved by associating the two properties to the same spatial location, e.g., "I am in a mental state that represents X as being at (location) *x* and in a mental state that represents Y as being at *x*." The latter could be achieved by a HOT with a content like "I am in a mental state that represents (object) *a* as being X and in a mental state that represents *a* as being Y." Both of these higher-order contents represent lower-order contents collectively, but they are more than mere conjunctive representations of the lower-order contents; there is a common element across the conjuncts to which perceived properties are associated. For our purposes, however, the details of how this association between X and Y is achieved is unimportant. What matters is that the higher-order representations do more than represent the two properties independently in the same content. It is also worth pointing out that a similar kind of cross-referencing would have to occur across mental states over time in order to successfully represent motion in addition to location.[2]

This requirement on the collective representations employed by the co-representation mechanism is not made explicit by Rosenthal. As has already been suggested, however, there is room for Rosenthal to accept it. There are a number of places where Rosenthal discusses the contents of HOTs and their target states, and in these discussions, Rosenthal allows for the possibility that HOTs do more than merely re-present the contents of their target states. The cocktail party effect and the case of the dental patient, both discussed earlier, are examples. Given that HOTs are free to add or subtract from the contents of

[2]Thanks to one of the reviewers for pointing this out.

their target states, there is no bar, in principle, to their representing certain relations as holding between lower-order states and their contents.

Mere Direct Reference

The common-ascription mechanism unifies consciousness by exploiting the direct and indexical manner in which HOTs refer to the subjects of their target states: each HOT ascribes its target state to an individual via the (mental analogue of the) reflexive indexical "I" and so the subject of a HOT is left with the sense that its conscious states all have the same subject. The impression one gets from Rosenthal's account is that it is direct and unmediated reference *itself* that is somehow responsible for producing the sense of unity. Reflexive indexical reference may well have something to do with producing a sense of conscious unity, but indexical reference cannot be enough to do so by itself.

Consider a situation in which you hear a person utter the sentences "I am tall" and "I am the oldest in my family" in the same conversation. Given the context — you witness the same person perform the two speech acts — you naturally take the two tokens of "I" to refer to the same individual. However, it is not the mere fact that you witness two tokens of "I" in close temporal proximity to each other that you understand them to have the same referent. Suppose you overhear the same two sentences and that they are, in fact, uttered by the same individual, but you do not *know* that they are uttered by the same individual. Perhaps you are not in direct visual contact with the speaker and you do not recognize the voice as the same across utterances. In this case, the two occurrences of "I" would have the same referent, but you would not understand them in this way. What is important to notice in this situation is that both tokens of "I" refer to their referents in a direct and unmediated way and the way they get their semantic content remains fixed across occurrences, but this does not by itself determine that audiences will understand two separate tokens of "I" to have the same referent. What is required in addition is certain contextual information and a disposition on the part of the audience to apply a working knowledge of the semantics of "I" to that contextual information.

An analogous point can be made with respect to the mental analogue of "I." Even though HOTs refer to the subjects of their target states in a direct and unmediated fashion via the mental "I," nothing *necessitates* that downstream mental processes or larger mental systems take separate HOTs to refer to the same individual. Consider the mental demonstratives "this" and "that." They refer to their referents in a direct and unmediated fashion, but this fact does not determine that minds in which they are tokened take separate tokens of these mental demonstratives to refer to the same object. In fact, it is most often the case that they are not taken in this way. If I spot a dark shadow in the distance while hiking in the forest I may think to myself "That could be a bear." If a short time later I look at a cloud in the sky and think "That looks like a hat," I do not take myself to have encountered a bear that looks like a fluffy white hat.

One might point out that there is a significant difference between the mental demonstratives "this" and "that" and the reflexive indexical "I." Tokens of the latter always refer to the same thing when tokened in the same mind, whereas this is not the case with "this" and "that." The content of the mental "I" is determined in a context-sensitive manner like "this" and "that," but the contexts in which tokens of "I" occur ensure that all tokens that occur in the same mind always refer to the same object. Minds like ours need to accommodate varying references across different tokens of the mental demonstratives, but they do not need to accommodate variance across different tokens of the mental "I." Thus, they treat the mental "I" differently than they do the mental demonstratives.

It is certainly the case that normal minds take successive tokens of "I" to refer the same individual. But this is not a *necessary* property of minds. Consider subjects suffering from dissociative identity disorder (otherwise known as multiple personality disorder). [See Brand and Loewenstein (2010), Kluft (1996), and Ross (1996) for general discussions of this disorder.] The memories, thoughts, decisions, etc., of these individuals are compartmentalized into distinct identities and personalities. Presumably these individuals often employ the mental "I" when they have thoughts about these mental states. Thus, subjects suffering from these disorders would seem to be examples of minds in which successive tokens of "I" are not taken by the same mind to refer to the same individual. What this shows is that it cannot be the mere fact that the mental "I" refers to its subject in a direct and unmediated way that is responsible for conscious unity. The mental systems that operate on HOTs have an equally important role to play.

I am not aware of any commitments Rosenthal might have that would prevent him from accommodating this point. Thus, neither this issue or the concerns I have raised above generate conclusive objections to his account. What they do, however, is reveal how his account should be developed and refined so as to avoid certain problems. I will now turn to some more serious worries that will reveal why Rosenthal's account cannot, ultimately, be the final word on conscious unity.

The Limitations of Co-Representation

As a means of accounting for conscious unity, the co-representation mechanism has a lot going for it. If a number of lower-order states appear in experience as unified in some way, it is plausible to think that their unification is the result of being represented together in a certain way. In the previous section, we saw how this might work in the case of object-unity. Similar considerations could apply with respect to spatial unity. However, there are other kinds of conscious unity for which the co-representation mechanism is either inadequate or for which it is not at all obvious how the mechanism could do the necessary unifying work.

Consider phenomenal unity again. My current global experience contains all of my current conscious states. Since all my current conscious states are part of the

same global experience, they are all mutually phenomenally unified with each other. In order for the co-representation mechanism to account for this, it would have to be the case that all of my current conscious states are represented together by a single higher-order state. But this seems highly unlikely. Our sensory experiences can be, and often are, highly complex. For a theory like Rosenthal's, this would seem to suggest that, not only do conscious subjects like us have extremely complex first-order sensory states, but that all the content of those first-order states must be "mirrored" or accounted for via belief-like states at the higher-order level. And as was pointed out above with respect to mere conjunctive representation, the higher-order states must also explicitly represent certain spatial relationships between the various elements of experiences, both at a time and across time. This would place an extremely large computational burden upon any system that instantiates this mental architecture. And for what purpose? It is easy to see how having complex sensory states would benefit an organism in the kind of environment we find ourselves in, but what is the benefit to having *beliefs* or *thoughts* about all our sensory states?[3] Note, this is not a question about the benefit of having the *capacity* for thought — clearly the capacity for thought has great benefit — but a question about the benefit of constantly having all of our first-order states represented in thought. Neural tissue is metabolically expensive (Aiello and Wheeler, 1995). This makes it quite unlikely that systems embodying this kind of representational parallelism would evolve absent an evolutionary benefit. Carruthers (2000, p. 221) calls this "the objection from cognitive overload."[4] Byrne (1997) presents an additional reason to doubt that we have the kind of complex higher-order thoughts this architecture requires. Many of our thoughts are unconscious, but we can, via introspection, make them conscious. Yet, when we try to introspect our thoughts about our sensory experiences, we never encounter such monstrously complex thoughts, especially not a single thought that represents *all* of one's lower-order sensory states.

The shortcomings of the co-representation mechanism go even further. We all enjoy temporally extended episodes of consciousness, many of them last for hours at a time. All the conscious states in such an episode are stream-unified. In order for the co-representation mechanism to account for stream-unity, higher-order states would have to be capable of representing all of one's conscious states in a given temporal span of consciousness at once. Even if, contrary to the above, there are higher-order states capable of representing all of a subject's conscious states at a time, there would still be the question regarding a subject's *past* conscious states. To the extent it is unlikely that a higher-order state can represent all of a subject's conscious lower-order states at a time, it is even more implausible that higher-order states are

[3]Seli (2012) makes a case for the utility of higher-order representations, but his focus is on the utility of having thoughts about thoughts, not about having thoughts about all our sensory states.

[4]It should be noted that Carruthers is himself a higher-order theorist. His own higher-order theory is developed, at least in part, as a response to this objection.

capable of representing all the conscious states in an entire episode of consciousness at once.

Rosenthal (2005c, p. 342) himself concedes the former. This is one of the reasons why he includes the common-ascription mechanism in his account, the idea being that it will pick up the slack where the co-representation mechanism falls short. This may seem to cover for the limitations of the co-representation mechanism, but as I will argue in the next section, the common-ascription mechanism is not up to the task.

The Limitations of Common Ascription

Like the co-representation mechanism, the common-ascription mechanism has a lot going for it. An important part of our experiential lives and our sense of ourselves as persons is the fact that we view past experiences and events as important aspects of who we take ourselves to be now. We all have a "personal identity," to use a colloquial term, and we think of ourselves within the context of an extended narrative or personal history. This is certainly a kind of conscious unity — Flanagan (1992) calls it "strong self-consciousness" — and the way in which we refer to ourselves directly in thought would certainly seem to have something to do with it. The deeper problem for the common-ascription mechanism and for Rosenthal's account as a whole, however, is that it cannot make up for some of the apparent shortcomings of the co-representation mechanism. I will present two reasons for this.

Expectations and Conscious Unity

HOTs make their target states conscious, but HOTs are not generally conscious themselves. This poses a bit of a challenge for Rosenthal. How can unconscious states be responsible for conscious unity?[5] Rosenthal addresses this worry by distinguishing between an explicit and an implicit sense of unity. Subjects enjoy an explicit sense of unity when they actively introspect. It is then that some of their HOTs become conscious. This is associated with the explicit sense of unity, because when HOTs are themselves conscious, their contents, including the direct way in which they refer to the subjects of their target states, are also conscious. Most of the time, however, subjects of consciousness are not engaged in active introspection. But when they are not actively introspecting, maintains Rosenthal, they still enjoy a tacit or implicit sense of unity. The tacit sense of unity is what remains after one's HOTs are no longer conscious. But what, exactly, is this tacit sense of unity? It is, according to Rosenthal, the expectation we have that we can become actively aware of our mental states if we wish. Rosenthal (2005c, p. 345) sometimes refers to this as a "dispositional" sense of unity.

[5]A similar kind of worry has also been raised for higher-order theories of consciousness more generally. How could unconscious states make us conscious of other mental states?

Because periods of active introspection are infrequent and short, HOTs can only be used as an explanatory tool for the kinds of conscious unity that are associated with periods of active introspection. Many other kinds of conscious unity, however, are much more persistent and pervasive throughout experience. This places a greater explanatory burden upon the tacit sense of unity. The question for Rosenthal is whether the *expectation* that one can, at any time, actively introspect one's mental states can do the explanatory work it needs to do.

As we have already seen, many of the different kinds of conscious unity have significant phenomenal consequences, and for these kinds of unity there is a significant phenomenal difference between a pair of conscious states being unified in the relevant way and not being unified in that way.[6] Some expectations also clearly have a phenomenal consequence. For instance, children seem to experience a certain set of feelings when they anticipate the opening of a jack-in-the-box. Likewise, certain feelings accompany the anticipation of a reprimand from a parent or superior. But other expectations have a much more subtle phenomenal consequence if they have a phenomenal consequence at all. When I step into an elevator and the door closes, I expect to feel a certain sensation in the pit of my stomach when the elevator begins to move. The sensation that accompanies the movement of the elevator certainly has an identifiable phenomenal character. The question, however, is whether the *expectation* I have beforehand has any sort of phenomenal consequence, and it is not at all obvious that it does.

There are others kinds of expectations that appear to be even more phenomenally inert. When I start my computer, for instance, I expect a certain sequence of events, but there is no *experience* of anticipating a computer's boot-up sequence. Or consider the expectations that I can add 2 and 3 together in my head if I decide to, that I can recall at will the births of my children, and that I can, if I wish, focus my attention on my big toe and wiggle it. None of these expectations seem to have any bearing at all on my current experience. Rosenthal associates the tacit sense of unity with the expectation that we can, at any moment, introspect our own mental states if we wish to. Many expectations do not seem to have any impact whatsoever upon the nature of our current experience. If they have no phenomenal consequence, it becomes unclear how a mere expectation could be said to be responsible for many of the different kinds of conscious unity.

Developmental Considerations

The second criticism I want to raise for the common-ascription mechanism is that it makes unity contingent upon two developmentally advanced mental abilities. As was

[6]Note that this does not entail that these kinds of unity have their own distinctive phenomenal character that they add to experience. Being unified in a certain way may effect the overall phenomenal character of an experience, but it can do so without adding a special "feel" of unity. One of the reasons for avoiding commitment to a special feel of unity is that it invites a kind of regress problem (see Hurley, 1998; Siewert, 2001; Tye, 2003).

alluded to above, a HOT is a thought with a content of the form "I am in such and such a mental state." This means that, in order for a subject to have a HOT, the subject must (i) be capable of a certain kind of self-reference, (ii) have the capacity to represent the contents of its lower-order states in sufficient detail — we have already seen how this is a source of difficulty for the co-representation mechanism — and (iii) have the ability to characterize those contents as contents of a *mental state*. Self-reference and having the concept of a mental state are both relatively advanced mental abilities. The issue for Rosenthal is that some kinds of conscious unity seem to be present in experience even when some of the subjects of those experiences do not have the relevant mental abilities.

What it means for a subject to possess or have a concept is a matter of some dispute, but what is relatively uncontroversial is that having a given concept correlates with being able to correctly apply it in certain ways. With respect to the concept of a mental state, this would seem to require the ability to discriminate between one's own mental states or to discern when one's mental states differ from those of another. This, in turn, might require one to demonstrate certain levels of self-awareness, such as being able to tell when one is happy rather than sad. Or it might require the ability to discriminate between a current experience and a memory. Or it could require the ability to recognize that others have different perceptual perspectives and, as a result, may have different beliefs. In the developmental literature, this latter ability is associated with having a "theory of mind." In a typical test for this ability, a young child and another individual are together shown the location of an object. The other individual is asked to leave the room and the object is moved to another location. The child is then asked where the person who left the room will look for the object when she returns. Children are only able to answer this question correctly when they reach 3 to 4 years of age (Gopnik and Astington, 1988; Wimmer and Perner, 1983). It is unclear whether any other animals ever acquire the concept of a mental state. Some of the advanced social mammals, like primates and canines, who are able to respond to the displeasure of others in their socials groups or cooperate in food-gathering and hunting activities, could be argued to have an extremely primitive concept of a mental state, but one does not have to descend too far down the mammalian hierarchy before almost all behaviour can be explained without reference to such a concept.

Some species of conscious unity seem to be present in conscious experience long before subjects acquire the concept of a mental state or possess the ability to ascribe mental states to themselves. Two kinds of unity for which this consideration is particularly apt are phenomenal unity and stream-unity. With respect to the former, there is a strong case to made for the claim that phenomenal unity is perfectly ubiquitous (Bayne, 2008, 2010; Friesen, 2013). To my knowledge, the only challenge to this claim comes from Lockwood's (1989) interpretation of

the split-brain data.[7] However, even those who challenge the ubiquity of phenomenal unity maintain that exceptions are quite rare, occurring only in atypical subjects like split-brain patients. This means that, for the vast majority of conscious subjects, including very young children and other mammals, phenomenal unity is an ever-present phenomenon. Thus, phenomenal unity cannot be explained by a mental capacity that very young children and many other mammals may not have.

The very same considerations apply for stream-unity. Conscious subjects, even very young children and many non-human animals, have temporally extended episodes of consciousness. Whatever is responsible for unifying conscious states into a stream of consciousness cannot depend on an ability they do not have. We saw that the co-representation mechanism cannot account for phenomenal unity or stream-unity. Thus it falls to the common-ascription mechanism to do the unifying work. But if this mechanism cannot account for the kinds of conscious unity that the co-representation mechanism is unable to account for, then there are some serious gaps in Rosenthal's account.

Readers familiar with the literature on higher-order theories of consciousness will recognize the parallel between this objection and a well-known objection to Rosenthal's HOT theory of consciousness (see Siewert, 1998, section 6.5; Seager, 2004; Tye, 1995, p. 5). If conscious experience is a product of higher-order representation in the way that Rosenthal claims, then it follows that subjects incapable of HOTs cannot be conscious. To many it seems absurd to claim that young children and most non-human mammals are incapable of conscious mental states. Gennaro (2004b) defends HOT theories by arguing that HOTs do not require the kind of sophisticated cognitive machinery many believe they do. Carruthers (1998), on the other hand, bites the bullet and maintains that young children and animals do not have conscious mental states. To theorists like Carruthers, the parallel objection to Rosenthal's account of conscious unity will have no sway — for creatures that do not have conscious states, questions about conscious unity do not arise — but for those who find the objection against HOT theories to have some force, the parallel objection to Rosenthal's account of unity will have just as much force.

Representational Mismatches

In this final section, I will turn from a critique of Rosenthal's account as an account of conscious unity and make an observation about how this account is also relevant to the broader discussion of higher-order theories of consciousness. One of the main objections that has been raised against higher-order theories of consciousness is an

[7]Views according to which split-brain patients have two distinct streams of consciousness do not challenge the ubiquity of phenomenal unity. They are views according to which a single brain houses two subjects of experience, each of which enjoys a single phenomenally unified stream of consciousness.

objection I will call the "Representational Mismatch Objection," or, for convenience, the "Mismatch Objection." I will argue that Rosenthal's account of conscious unity relies upon the same kind of representational mismatches that the Mismatch Objection trades upon.

The Mismatch Objection

The Mismatch Objection has been pressed against higher-order theories by numerous theorists (see Block, 2011; Byrne, 1997; Gois, 2010; Levine, 2001; Neander, 1998). Wherever representations are involved, including mental representations, it is possible for the representational vehicle to misrepresent its target. Higher-order theories maintain that mental states are conscious when they are represented in the appropriate way. Given the possibility of misrepresentation, the question can be asked what it is like for the subject when a higher-order state misrepresents its target lower-order state. More specifically, the question can be asked whether, in cases of misrepresentation, the phenomenal character of the subject's experience conforms more to the representational content of the (higher-order) representing state or the (lower-order) represented state. No matter how it is answered, the answer seems to undermine the theory.

Suppose my visual system is working correctly while I look at my red mug under normal lighting conditions. This will generate a sensory state in me that represents my mug as red. Now suppose my sensory state becomes the representational object of a higher-order state, but, instead of representing my (lower-order) sensory state as a state that represents my mug as red, it represents my sensory state as a state that represents my mug as green. What will the phenomenal character of my experience be? Will it have the property of phenomenal redness or phenomenal green-ness? If it has the property of phenomenal redness, then it becomes unclear what the role of the higher-order state is in making the lower-order state conscious. For if the phenomenal character of my experience conforms to the representational content of my lower-order state, we are left to wonder whether I could have had the very same experience if the lower-order state had occurred in the absence of the higher-order state. The door is opened to the possibility that mental states do not need to be targeted by higher-order states to become conscious. Suppose, instead, that my experience has the property of phenomenal green-ness, conforming to the representational content of my higher-order state. Since higher-order states are not, in general, themselves targeted by further higher-order states, the door is again opened to the possibility that a mental state can be conscious without being the target of any higher-order state.[8]

[8]Mandik (2009) has also raised an objection against higher-order theories that is driven by considerations of representational mismatches. Mandik's conclusion, however, is a bit stronger and perhaps a bit more general than the conclusions of those listed here. He argues that there is no such property as *being represented* and so there is no property for the property of *being conscious* or *being phenomenal* to be identified with.

Many regard the Mismatch Objection as decisive. Others (Gennaro, 2004b; Rosenthal, 2011; Weisberg, 2011a, 2011b) have argued that it is not. I will not weigh in on this dispute here. Instead, I will show that Rosenthal's account of conscious unity systematically incorporates the kind of representational mismatches that the Mismatch Objection trades upon. I will do this by considering each of the two mental mechanisms in Rosenthal's account in turn.

Conscious Unity and Representational Mismatches

The co-representation mechanism purports to unify a series of conscious states by representing all of them together in a single higher-order representation. This scenario invites the Mismatch Objection because it is a situation in which the overall phenomenal character of a subject's experience at a time most closely matches the content of an unrepresented mental state. By offering an account of conscious unity, Rosenthal implies that conscious unity would not occur independently of the mechanisms featured in the account. In this case, it is implied that a situation in which a series of mental states are not represented together by a single HOT would generate a different kind of global experience than a situation in which those same states were represented by a single HOT. It is not enough to have the respective lower-order states each represented by their own distinct HOT. Rather, the unified character of the subject's experience is the result of the lower-order states being represented *together* by a single HOT. This constitutes a kind of representational mismatch. The representational content at the higher-order level includes a representational element that is not present at the lower-order level. Though all of the represented states appear at the lower-order level, their togetherness is not represented there. It is only represented at the higher-order level. Since HOTs are not themselves typically represented by further higher-order states, it would seem as though we have a situation in which the character of a subject's overall experience matches the representational content of an unrepresented state. And from this we are left to infer that it is the unrepresented higher-order state that is responsible for the character of the experience.

The common-ascription mechanism also makes conscious unity a product of the content of higher-order states. According to this way of accounting for conscious unity, the sense of unity (explicit or tacit) hinges upon the fact that HOTs refer to subjects of their target states in a direct and unmediated way via the mental reflexive indexical "I." Here again the phenomenal differences associated with conscious unity correspond to a representational element that occurs only at the higher-order level. The mental indexical this unifying mechanism hinges upon is a representational element in HOTs, not their target states. And just as with the co-representation mechanism, we are left to infer that it is the content of higher-order states that is responsible for the overall phenomenal character of experience.

It is doubtful that the observation I have made here about how Rosenthal's account of conscious unity relies upon representational mismatches will sway many opinions about the force of the Mismatch Objection against his HOT theory of consciousness. Those who believe the Mismatch Objection to be decisive against it have merely been provided with more fodder for their cannon. Those who believe the Mismatch Objection is not decisive, will rely on the same arguments to show that these representational mismatches are not problematic. However, the observation I have made here does contribute something of significance to the debate. One defensive strategy the higher-order theorist could employ would be to argue that, although representational mismatches are possible, they are, nevertheless, exceptions to the rule. What my observation shows is that this strategy is off the table for the higher-order theorist who wishes to adopt Rosenthal's account of conscious unity.

Conclusion

Conscious unity is not a homogeneous mental property. There are many different kinds of conscious unity and any attempt to account for conscious unity must be sensitive to this. It is implausible to think that a proportionally small number of mental mechanisms will be able to do the job of accounting for all of them. A closer examination of the two mental mechanisms in Rosenthal's account bears this out. There are at least some kinds of conscious unity that neither mechanism can account for. Thus, Rosenthal's account fails as a perfectly general account of conscious unity.

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Expansion of the Concept of Mental Disorder in the DSM–5

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The *Diagnostic and Statistical Manual of Mental Disorders* (DSM) revision process has been systematically biased toward expanding diagnostic criteria to become more inclusive, but research has yet to determine if the DSM–5 shows signs of the same bias. In this study, 83 disorders revised between the DSM–IV–TR and DSM–5 received codes based on whether the diagnostic criteria conceptually became more inclusive by allowing more individuals to be diagnosed or more exclusive by allowing fewer individuals to be diagnosed. Results showed that more disorders (36%) shifted toward inclusivity than toward exclusivity (25%). Also, seven out of 10 types of DSM revisions showed a net shift toward inclusivity. These results indicate that expansion of the concept of mental disorder has continued with the DSM–5.

Keywords: DSM, conceptual bracket creep, definition of mental disorder

The *Diagnostic and Statistical Manual of Mental Disorders* (DSM) defines mental illness for mental health professionals who use it as a tool for communication, research, treatment, and remuneration. The DSM is currently in its fifth edition (DSM–5; American Psychiatric Association, 2013), and each iteration of the manual has seen additions, deletions, and revisions that have dramatically changed both individual disorders and the concept of mental illness itself. The DSM is a product of both social and scientific factors; thus, the revision process is affected by a host of personal, political, and practical biases (Frances, 2013; Houts, 2002; Shorter, 2013; Welch, Klassen, Borisova, and Chothier, 2013). One sign of such bias is the fact that the revision process from the DSM–III (American Psychiatric Association, 1980) through the DSM–IV–TR (American Psychiatric Association, 2000) resulted in a systematic expansion of diagnostic criteria (Boysen, 2011). Such expansion is varyingly referred to as overdiagnosis (Pierre, 2013), conceptual bracket creep (McNally, 2004), or diagnostic inflation (Frances and Widiger, 2012), but all of these terms refer to the fact that mental

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disorders have changed in scope to include more and more individuals. Frances (2013, p. 204) has characterized diagnostic inflation as switching to a new phase of "diagnostic hyperinflation" with the publication of the DSM–5, but this claim was based on a selective review of disorders. The purpose of the current research is to systematically review the DSM–5 in order to determine if the revisions show a bias toward expansion.

The DSM–5 Revision

The DSM–5 was mired in criticism and controversy well before its publication. Concerns about the manual were wide-ranging and even resulted in an online petition with over 10,000 signatures (Frances, 2009, 2010, 2011; Welch et al., 2013). Some have pointed out that the DSM–5 Task Force began poorly by promising too much; the Task Force described the upcoming edition as a paradigm shift, which caused people with strong investments in the DSM framework to worry about the extent of changes to come (Welch et al., 2013). Each major revision of the DSM produces a list of new disorders, and the proposals for the DSM–5 were a particular source of concern. Some perceived Attenuated Psychosis Syndrome as an essential tool in the early identification of Schizophrenia, but critics charged that the diagnosis was not very useful or appropriate for that stated purpose (David, 2011; Yung, Wood, McGorry, and Pantelis, 2011). The purpose of Mixed Anxiety–Depression Disorder would have been to capture the many individuals who experience distress that does not fall neatly into the traditional set of disorders in the Anxiety or Mood Disorder categories, but critics believed it to be a poorly understood, unstable disorder that threatened to turn subthreshold symptoms into a diagnosis (Batelaan, Spijker, de Graaf, and Cuijpers, 2012). Proposals also emerged for a number of new sexual disorders including sexual attraction to teenagers (Hebephilia), committing repeated sexual assaults (Paraphilic Coercive Disorder), and excessive sexual behavior (Hypersexual Disorder), but in each case the validity was questionable because the diagnosis would capture just a small number of people with actual mental disorders and a much larger number of people who were either normal or simply criminals (Wakefield, 2011, 2012). None of the aforementioned disorders made it into the final version of the DSM–5, but others deemed worthy of inclusion faced similar criticism (Frances and Chapman, 2013; Martin, Steinley, Verges, and Sher, 2011; Nemeroff et al., 2013).

The creation of new disorders is one major result of the DSM revision process, but alterations to the criteria of individual disorders are no less important and no less a source of debate. Perhaps no change to criteria garnered more attention than the remolding of Autistic Disorder, Asperger's Disorder, and several other disorders into Autism Spectrum Disorder. Criticism about the Autism revision was multifaceted, but much of it focused on the prediction that fewer high-functioning

individuals would meet the new disorder's criteria, which would hinder mental health treatment (Hazen, McDougle, and Volkmar, 2013). Autism Spectrum Disorder, however, appears to be the only disorder for which tightening of diagnostic thresholds was a major concern. Most criticism focused on the expansion of diagnostic thresholds. For example, the Attention-Deficit/Hyperactivity Disorder (ADHD) criteria saw an upward shift in the minimum age of onset, which some perceived as the further encroachment into adulthood of a disorder once conceptualized as pertaining only to childhood (Bastra and Frances, 2012). Even the venerable and long-stable criteria for Major Depression became more inclusive through the deletion of the exclusion for recently bereaved individuals, which some characterized as a needless medicalization of the natural grieving process (Nemeroff et al., 2013; Wakefield and First, 2012). Predictions notwithstanding, empirical research must be conducted to determine the actual effects of DSM revisions on prevalence.

Some evidence has already emerged concerning the effects of DSM–5 revisions on prevalence rates. Autism has been the subject of the majority of new studies. Extant research suggests that fewer people will meet the criteria for the new Autism Spectrum Disorder than met the criteria for Autism, Asperger's, and Pervasive Developmental Disorder Not Otherwise Specified (NOS; Kim et al., 2014; Maenner et al., 2014; Matson, Hattier, and Williams, 2012; Matson, Kozlowski, Hattier, Horovitz, and Sipes, 2012; Wilson et al., 2013). However, the prevalence of DSM–5 Autism Spectrum Disorder is higher (2.20%) than the combined rates of Autistic Disorder (1.04%) and Asperger's Disorder (0.60%) using the DSM–IV criteria (Kim et al., 2014). The fact that fewer people are represented after the elimination of a catchall NOS diagnosis is hardly surprising. Researchers have also found that the new Somatic Symptom Disorder, which combines a number of DSM–IV–TR Somatoform Disorders, captures fewer people than the disorders it replaced (Voigt et al., 2012). However, the prevalence estimate was based on inpatients hospitalized for psychosomatic illness and needs to be replicated among groups with higher potential for false positive diagnoses such as outpatients and individuals with medical illnesses (Frances, 2013; Frances and Chapman, 2013; Häuser and Wolfe, 2013).

A number of other studies have produced either evidence for increased prevalence or inconclusive results. Evidence for increased prevalence has emerged in relation to ADHD (Vande Voort, He, Jameson, and Merikangas, 2014), Gambling Disorder (van de Glind et al., 2014), Anorexia, and Bulimia (Allen, Byrne, Oddy, and Crosby, 2013; Machado, Gonçalves, and Hoek, 2013; Stice, Marti, and Rohde, 2013). The new Substance Use Disorder combined the previous criteria for Substance Abuse and Substance Dependence, but the effect of this combination on prevalence is unclear. Although one study found a decrease in prevalence when using the new criteria compared to the old criteria (Proctor, Kopak, and Hoffmann, 2014), others point to an increase in prevalence (Agrawal, Heath, and Lynskey, 2011;

Peer et al., 2013). The DSM–5 Posttraumatic Stress Disorder (PTSD) criteria represented a genuine effort to reduce the scope of events that could be classified as traumatic (American Psychiatric Association, 2013; Friedman, Resick, Bryant, and Brewin, 2011), but other criteria were altered as well, and it is not clear if the net changes resulted in a prevalence increase or decrease (Carmassi et al., 2013; Kilpatrick et al., 2013). Although there is much research left to be done on the prevalence rates of DSM–5 disorders, the extant evidence does little to reduce concern about the ever-expanding concept of mental disorder.

Expansion of the DSM

Reviews have suggested that the DSM has been consistently expanding with each new edition (Boysen, 2011; Houts, 2002). Types of expansions include the sheer number of diagnoses and the inclusiveness of specific disorder criteria. The number of disorders has doubled and tripled since the first edition of the DSM (Houts, 2002). The argument can be made that numerical growth represents scientific advancement because disorders are split into smaller, more coherent categories as they are better understood (Regier, Kuhl, and Kupfer, 2013; Sptizer, 2001). An example of splitting in the DSM–5 was the separation of Reactive Attachment Disorder into separate diagnoses representing difficulty forming attachments (Reactive Attachment Disorder) and the formation of indiscriminant attachments (Disinhibited Social Engagement Disorder) due to differences in symptoms, course, and treatment response (Regier et al., 2013). Splitting certainly occurs during DSM revisions, but it does not explain all new disorders that emerge.

Some disorders are created to facilitate preventative treatment. Trends in the prevention of mental disorders mimic larger trends in preventative medicine (Frances, 2013; Paris, 2013). Just as hypertension is diagnosed as an early sign of heart disease, some mild psychological problems are predictors of later, more severe, problems. For example, Mild Neurocognitive Disorder was included in the DSM–5 to serve as a risk factor for later dementia (Peterson et al., 2009). Filling of diagnostic gaps is another reason new disorders are created. For example, Binge Eating Disorder allows people who lose control over their eating to be diagnosed even if they do not engage in the compensatory behaviors associated with Anorexia or Bulimia. Other disorders are created to solve diagnostic problems. For example, Disruptive Mood Dysregulation disorder is a DSM–5 disorder added to address what many believed was the inappropriate diagnosis of Bipolar Disorder among children with irritability and conduct problems (Nemeroff et al., 2013; Paris, 2013; Regier et al., 2013). Although the reasons for their inclusion are varied, it is clear that the number of disorders in the DSM has expanded over time.

The second major way that the DSM has expanded is with the inclusiveness of the definitions of mental disorders themselves. Diagnostic criteria are by their very nature exclusionary; they are operational definitions intended to differentiate

valid cases from noncases. However, there are always individuals whose symptoms fall just outside of the criteria for a disorder. Such exceptions are frustrating for experts assigned to the workgroups in charge of revising the DSM. Experts are primarily concerned with false negatives (Frances and Widiger, 2012). They want every possible instance of a disorder to be counted in order to bolster their field of expertise and research. As such, diagnostic criteria tend to be altered to account for more and more variations of symptoms. Such expansion of diagnostic criteria has come to be known as conceptual bracket creep (McNally, 2004).

Discussion of conceptual bracket creep in diagnostic criteria began in the PTSD literature. PTSD once required exposure to specific types of extreme trauma that were outside of normal experience (McNally, 2004). Then, the DSM–III–R allowed trauma to include witnessing family or friends exposed to those events. Next, the DSM–IV deleted the requirement that the trauma be outside of normal experience, allowed the person exposed to trauma to be separate from the person who is diagnosed, and allowed indirect confrontation with the event. Considering these revisions, trauma stopped being defined by objective, external events and began being defined by subjective, internal experiences. These changes had the express purpose of allowing more people to be diagnosed with the disorder (McNally, 2004). Efforts to make the disorder more inclusive even included proposals to completely eliminate the trauma requirement — posttraumatic stress would have been diagnosed in the absence of trauma (Friedman et al., 2011; McNally, 2004). PTSD is just one of many cases of bracket creep in the DSM.

Childhood disorders have been especially subject to conceptual bracket creep (Batstra, Hadders–Algra, Nieweg, Van Tol, Pijl, and Frances, 2012). The previously mentioned case of ADHD is one extreme example. The disorder has slowly evolved from a childhood-only disorder to a disorder applicable to adults (Batstra and Frances, 2012; Conrad and Potter, 2000). Descriptions of ADHD symptoms in the DSM were once overtly applicable only to children, but revisions such as deleting references to school have made them appropriate for all ages. The DSM–5 has extended this process even further by lowering the number of symptoms adults need for diagnosis and raising the minimum age for the onset of symptoms from seven to 12. Autism has also exhibited bracket creep (Gernsbacher, Dawson, and Goldsmith, 2005). The DSM–III required six specific criteria for Autism to be diagnosed, but the diagnostic criteria in the DSM–III–R switched to a list of optional symptoms. Continuing this process, the DSM–5 collapsed five different disorders into Autism Spectrum Disorder, eliminated the requirement for language impairment, and expanded the age of onset from three years to the "early developmental period" (American Psychiatric Association, 2013, p. 50). Despite criticism that creating one disorder to represent a spectrum of autism symptoms will result in the exclusion of some individuals who were previously being diagnosed (Hazen et al., 2013), it is difficult to conceptualize these revisions as doing anything but allowing more variations in behavior to be called "autism."

The DSM–5 contains many additional examples of conceptual bracket creep. Somatic Symptom Disorder, which essentially consists of distress about any physical symptom, represents an aggregation of Somatization Disorder, Undifferentiated Somatoform Disorder, and Pain Disorder (American Psychiatric Association, 2013). However, some have argued that the criteria overextends the construct of Somatoform Disorders to include distress that is normal, and perhaps even reasonable, among people with serious physical ailments (Frances, 2013; Frances and Chapman, 2013; Häuser and Wolfe, 2013). Less substantial revisions have also resulted in bracket creep. Bulimia and Binge Eating Disorder now only require one binging episode per week rather than two. Dissociative Identity Disorder now allows symptoms to be reported by the individual rather than witnessed by the clinician. Feeding Disorder of Infancy or Early Childhood, now called Avoidant/Restrictive Food Intake Disorder, is no longer exclusive to children, and neither is Separation Anxiety Disorder.

Although the changes classified as bracket creep may seem minimal, slight variations in diagnostic criteria can have significant effects on prevalence. Starting at the most basic level, the number of symptoms required has a significant effect on prevalence (Andrews and Hobbs, 2010; Pélissolo, André, Moutard–Martin, Wittchen, and Lépine, 2000; Schützwohl and Maercker, 1999). For example, in one study the requirement of both restlessness and muscle tension in the diagnosis of Generalized Anxiety Disorder led to a 45% reduction in symptom prevalence compared to when just one of the symptoms was required (Andrews and Hobbs, 2010). Reducing the duration and frequency of symptoms can also affect prevalence (Andrews and Hobbs, 2010; Hudson, Coit, Lalonde, and Pope, 2012; Trace et al., 2012). Again using Generalized Anxiety Disorder as an example, changing the duration requirement from six months to three months resulted in an 18% increase in prevalence. Altering the severity of disorders also affects prevalence. Reducing the severity of PTSD by allowing indirect forms of trauma increased the prevalence of people reporting trauma exposure by 69% (Breslau and Kessler, 2001). In terms of the severity of Major Depression, changing the requirement that depressed moods last "all day" to "most of the day" and "half of the day" resulted in 5%, 9%, and 12% of people assenting to the symptom, respectively (Karlsson, Marttunen, Karlsson, Kaprio, and Hillevi, 2010). Clearly, bracket creep can have significant effects on the prevalence of mental disorders.

It is important to note that not all revisions in the DSM–5 exhibit bracket creep. In fact, many revisions represented attempts to tighten up the criteria or otherwise restrict diagnosis (American Psychiatric Association, 2013). For example, the definition of trauma in the PTSD criteria now explicitly excludes the indirect exposure allowed in previous editions of the DSM. A number of disorders have new requirements for minimal length including Agoraphobia, Specific Phobia, Social Phobia, and the Sexual Dysfunctions. Mania now requires both elevated mood and increased energy. Schizophrenia now requires at least one symptom to be a delusion, hallucination, or disorganized speech. Considering the evidence for

bracket creep and diagnostic tightening, did the net result of revisions move the DSM–5 toward expansion or reduction of the number of people who meet the criteria for mental disorders? That question has yet to be fully explored, and the purpose of the current research is to review the evidence for diagnostic expansion of criteria in the DSM–5.

The Current Research

The current research consists of a systematic review of the DSM–5 criteria for mental disorders. All previous prevalence studies and critical analyses of the DSM–5 have been necessarily limited in their scope; at best, they included just a handful of disorders. Examination of select disorders does not provide evidence for or against systematic expansion of the concept of mental disorder in the DSM–5. However, previous research illustrates how the DSM revision process can be reviewed more completely (Boysen, 2011). The previous review examined revisions to individual disorders from the DSM–III to the DSM–V–TR. Revisions to each disorder received a code based on whether the changes expanded or reduced the number of people who could theoretically meet the criteria. For example, deletion of criteria, adding more symptom options, and reducing severity would all be coded as making a disorder more inclusive. The results of the review illustrated a systematic bias toward expansion in the DSM revision process. Across all three revisions, 63% of disorders had a net shift toward inclusivity, and only 16% had a net move toward exclusivity. Expansion was largest for the DSM–III–R, but the revisions of each edition of the DSM resulted in a net move toward inclusivity. The most common means of expansion were adding symptom options and reducing severity, but seven out of the 10 different types of revision had a net move toward inclusivity. Although a review of diagnostic criteria does not provide evidence of actual diagnostic practices or the prevalence of mental disorders, the results of the study were consistent with a general perception of diagnostic inflation in the DSM (Frances, 2013; Paris, 2013).

The purpose of the current research was to update the review of DSM criteria to reflect the DSM–5 changes. Comparisons occurred between 83 different DSM–IV–TR and DSM–5 definitions of mental disorders. The focus of the review was on standard mental disorders; as such, it excluded medically- or substance-induced disorders and the Other Specified/Unspecified disorders. Each revision that occurred to a disorder received a code representing whether the change theoretically expanded or reduced the number of people who could be diagnosed. The net results of the revisions provide evidence about whether or not the DSM–5 has continued the previously identified trend toward expansion of the concept of mental disorder.

Method

The review included revisions made to 83 disorders between the DSM–IV–TR (American Psychiatric Association, 2000) and DSM–5 (American Psychiatric Association, 2013). Only disorders with a one-to-one correspondence between the two editions of the DSM could be reviewed. Thus, diagnoses that were combined or completely redesigned (e.g., Substance-Use Disorders, Autistic Disorder, Hypochondriasis) could not be included. Following previous research (Boysen, 2011), the focus of the review was on mental disorders; this led to the exclusion of Substance/Medication-Induced Disorders, Disorders Due to a Medical Condition, and the Other/Unspecified Disorders.

All coding procedures followed the guidelines established in previous research, and a more detailed discussion of the logic behind the procedures can be found in that study (Boysen, 2011). There were ten codable revisions: (a) the number of required symptoms, (b) the number of symptom options available, (c) the number of criteria, (d) the duration of symptoms, (e) the frequency of symptoms, (f) age requirements, (g) use of criteria vs. symptoms lists, (h) required behavioral acts vs. mental acts, (i) requirement of observation of symptoms vs. self-report, and (j) the severity of wording. Each revision type is capable of making a disorder more exclusive if it allows fewer people to meet the criteria or more inclusive if it allows more people to meet the criteria. Increases in the number of required symptoms, the number of criteria, the required duration of symptoms, or the required frequency of symptoms received a code representing increased exclusivity, and decreases received a code representing increased inclusivity. Addition of an age requirement or acceptance of a narrower age range received a code representing increased exclusivity, and removal or expansion of an age requirement received a code representing increased inclusivity. A switch from a list of optional symptoms to specific, required criteria received a code representing increased exclusivity, and a revision in the opposite direction received a code representing increased inclusivity. A switch from allowing mental symptoms to requiring behaviors received a code representing increased exclusivity, as did a switch from allowing self-report of symptoms to requiring the observation of symptoms; changes in the opposite directions received codes indicative of increased inclusivity. Finally, wordings that became more severe received a code representing increased exclusivity, and wording that became less severe received a code representing increased inclusivity.

Coding occurred only for criteria that contributed to the specific operational definition of each mental disorder. Clinical significance statements such as "The symptoms cause clinically significant distress or impairment in social, occupational, or other areas of functioning" received no code. Similarly, exclusionary criteria stating that a disorder is not caused by substances, medical illness, or other mental disorders received no code. As outlined in previous research (Boysen, 2011),

although clinical significance and exclusionary criteria are technically part of DSM definitions, they contribute nothing to the actual descriptions of the symptoms of mental disorder. In addition, the previous review demonstrated that including them in the coding system did not alter basic trends in results (Boysen, 2011).

The coding system allowed for simple arithmetic analysis of changes in diagnostic criteria. Revisions that increased exclusivity received a code of –1. Revisions that increased inclusivity received a code of 1. Analysis of trends occurred by tabulating sums across the various categories in order to represent the theoretical move toward exclusivity or inclusivity. For example, individual disorders could have net changes toward exclusivity or inclusivity, as could disorder categories such as Mood Disorders or Anxiety Disorders (analyses utilized the more familiar DSM–IV–TR categories rather than the new DSM–5 categories). Net changes could also be tabulated for specific types of revisions (e.g., number of criteria, severity).

Results

The initial analyses examined the overall change between the DSM–IV–TR and the DSM–5. Results for individual disorders can be seen in Table 1. Of the 83 disorders, 32 showed no net change. Some disorders' criteria remained identical between the DSM editions (e.g., all Personality Disorders), but others included revisions equally indicative of exclusivity and inclusivity. The next largest group of disorders, 30 in total, showed net changes toward inclusivity. Finally, 21 disorders had a net change toward more exclusive criteria. Taken together, these results indicate a general shift toward inclusivity in the DSM–5.

The next analyses examined changes among different categories of disorders. Each DSM–IV disorder category received a score based on the net change among its corresponding disorders. Six categories had net changes indicative of a shift toward inclusivity: Childhood (6), Dissociative (3), Eating (3), Mood (1), Factitious (1), and Sleep (1). Four categories had net changes indicative of a shift toward exclusivity: Schizophrenia and Psychotic (–3), Anxiety (–2), Impulse-Control (–1), and Sexual and Gender Identity (–1). Three categories showed no net change: Somatoform, Adjustment, and Personality. One potential problem with the previous analysis is that categories may have been unduly influenced by outlier disorders that underwent many changes. As such, a separate analysis of categories examined the total number of disorders moving toward exclusivity (coded as –1) and inclusivity (coded as 1). This alternative approach resulted in similar trends. Six categories had net changes indicative of a shift toward inclusivity: Childhood (3), Dissociative (2), Eating (2), Sleep (2), Factitious (1), and Sexual and Gender Identity (1). Six categories of disorders had no net change: Adjustment, Anxiety, Impulse-Control, Mood, Personality, and Somatoform. Only one category, Schizophrenia and Psychotic, had a negative net change indicative of a shift toward exclusivity (–3). Taken together, the examination of diagnostic categories illustrated a greater shift toward inclusivity than exclusivity.

The final analysis examined how the different types of revisions affected exclusivity and inclusivity. Seven out of the 10 types of revisions received positive net scores indicating that they were used in the DSM–5 to increase inclusivity: number of symptom options available (14), severity of wording (7), required behavioral acts vs. mental acts (3), number of required symptoms (2), number of criteria (2), requirement of observation of symptoms vs. self-report (2), and use of criteria vs. use of symptoms lists (1).

Table 1

Net Change in Mental Disorder Exclusivity Between the DSM–IV–TR and the DSM–5

Disorder	Net change
Acute Stress Disorder	1
Adjustment Disorder	0
Agoraphobia	–2
Anorexia Nervosa	2
Antisocial Personality Disorder	0
Attention-Deficit/Hyperactivity Disorder	3
Avoidant Personality Disorder	0
Bipolar II	1
Body Dysmorphic Disorder	–1
Borderline Personality Disorder	0
Brief Psychotic Disorder	–1
Bulimia Nervosa	1
Chronic Motor or Vocal Tic Disorder (Persistent Motor or Vocal Tic Disorder)	1
Circadian Rhythm Sleep Disorder (Circadian Rhythm Sleep–Wake Disorders)	0
Conduct Disorder	0
Conversion Disorder	1
Cyclothymia	–1
Delusional Disorder	1
Dependent personality Disorder	0
Depersonalization Disorder	1
Developmental Coordination Disorder	–3
Disorder of Written Expression (Specific Learning Disorder)	–1
Dissociative Amnesia	0
Dissociative Identity Disorder	2
Dysthymic Disorder (Persistent Depressive Disorder)	0
Encopresis	0
Enuresis	0
Exhibitionism	1
Factitious Disorder	1
Feeding Disorder of Infancy or Early Childhood (Avoidant/Restrictive Food Intake Disorder)	4
Female Orgasmic Disorder	0
Fetishism (Fetishistic Disorder)	0
Frotteurism (Frotteuristic Disorder)	1
Gender Identity Disorder (Gender Dysphoria in Adults)	1
Gender Identity Disorder (Gender Dysphoria in Children)	0
Generalized Anxiety Disorder	0
Histrionic Personality Disorder	0
Hypoactive Sexual Desire Disorder (Male Hypoactive Sexual Desire Disorder)	–1
Intermittent Explosive Disorder	–2
Kleptomania	0

Table 1 (continued)

Major Depressive Disorder	1
Male Erectile Disorder (Erectile Disorder)	–1
Male Orgasmic Disorder (Delayed Ejaculation)	–2
Mania (Bipolar I)	0
Mathematics Disorder (Specific Learning Disorder)	–1
Mental Retardation (Intellectual Disability)	1
Narcissistic Personality Disorder	0
Narcolepsy	2
Nightmare Disorder	1
Obsessive Compulsive Disorder	1
Obsessive Compulsive Personality Disorder	0
Oppositional Defiant Disorder	0
Panic Disorder	–1
Paranoid Personality Disorder	0
Pathological Gambling (Gambling Disorder)	0
Pedophilia (Pedophilic Disorder)	0
Phonological Disorder (Speech Sound Disorder)	0
Pica	0
Posttraumatic Stress Disorder	1
Premature Ejaculation	–2
Primary Hypersomnia (Hypersomnolence Disorder)	1
Primary Insomnia (Insomnia Disorder)	–3
Pyromania	0
Reading Disorder (Specific Learning Disorder)	–1
Rumination Disorder	0
Schizoid Personality Disorder	0
Schizoaffective Disorder	–1
Schizophrenia	–1
Schizophreniform Disorder	–1
Schizotypal Personality Disorder	–1
Selective Mutism	–1
Separation Anxiety Disorder	–1
Sexual Masochism (Sexual Masochism Disorder)	–1
Sexual Sadism (Sexual Sadism Disorder)	–1
Social Phobia (Social Anxiety Disorder)	–1
Specific Phobia	–1
Stereotypic Movement Disorder	–1
Stuttering (Child-Onset Fluency Disorder)	–2
Tourette's Disorder	–2
Transient Tic Disorder (Provisional Tic Disorder)	–2
Transvestic Fetishism (Transvestic Disorder)	–2
Trichotillomania	–2
Voyeurism (Voyeuristic Disorder)	–3

Note: names in parentheses represent DSM–5 revisions.

Three types of revisions received negative net scores indicating that they were used to increase exclusivity: duration of symptoms (–15), age requirements (–4), and frequency of symptoms (–2). Averaging across all types of changes, the net score was 10. These results indicate that the various types of revisions conducted in the DSM–5 were primarily used to increase inclusivity.

Discussion

The purpose of the current review was to determine if the DSM–5 revision process was biased toward expanding the criteria of mental disorders. Each metric used to examine the DSM–5 revisions showed overall trends toward increased inclusivity rather than exclusivity. The number of disorders shifting toward inclusivity exceeded those shifting toward exclusivity. Similarly, more categories of disorders shifted toward inclusivity than toward exclusivity. Also, seven out of 10 possible types of DSM revisions moved toward inclusivity. Overall, these results provide clear evidence for continued expansion of the concept of mental disorder in the DSM–5.

The results of the current study are consistent with several lines of previous research. To begin, the current research matches less systematic evaluations of the DSM. Many critics have characterized the DSM as being in a general state of diagnostic inflation (Frances and Widiger, 2012; Paris, 2013; Pierre, 2013). Evidence that the DSM–5 revision process was biased toward expansion also replicates a previous review of revisions from DSM–III through the DSM–IV–TR (Boysen, 2011). The review showed that 53% of disorders became more inclusive during the revision that produced the DSM–III–R, and 32% of disorders became more inclusive with the DSM–IV (the DSM–IV–TR is omitted here because it included only four revisions). Similar to these results for previous revisions, the current study illustrated that 36% of disorders became more inclusive with the DSM–5. In addition, the exact same types of revisions moved toward exclusivity and inclusivity in the DSM–5 as occurred in previous revisions.

A conceptual review of DSM criteria is not directly comparable to epidemiological research, but this study's evidence of expansion is consistent with some limited evidence for increased prevalence when using the DSM–5 diagnostic criteria. ADHD underwent a large expansion in the DSM–5 that was primarily focused on making the disorder easier to diagnose among adults, and one study has demonstrated a concomitant increase in prevalence using the new criteria (Vande Voort et al., 2014). Both Anorexia and Bulimia underwent revisions that increased inclusivity, and three studies have documented increased prevalence rates with the DSM–5 criteria (Allen et al., 2013; Machado et al., 2013; Stice et al., 2013). Not all prevalence studies align so clearly with this study's results, however. Gambling Disorder's exclusivity did not change in this study, but one prevalence study demonstrated increased rates using the DSM–5 criteria (van de Glind et al., 2014). PTSD underwent a complex revision with numerous major and minor changes. Some aspects of the revision were intended to make the criteria more exclusive (Friedman et al., 2011), but the current review indicates an overall shift toward inclusiveness. Perhaps reflecting the complexity of the changes, epidemiological research has produced conflicted results concerning whether the PTSD revision increases or decreases the disorder's prevalence (Carmassi et al.,

2013; Kilpatrick et al., 2013). It will take many more studies before the effect of PTSD revisions is fully understood, and the same is true of the dozens of other disorders that have DSM–5-based prevalence rates that have yet to be investigated. Nonetheless, the current study provides no reason to believe that rates will fall rather than continuing their steady rise.

Despite an overall trend toward inclusiveness, expansion of diagnostic criteria in the DSM–5 appears to be somewhat attenuated from that found in the DSM–IV, which in turn showed less expansion than the DSM–III–R (Boysen, 2011). Although the percentage of disorders with increased inclusiveness was similar between the DSM–IV and the DSM–5, there were more disorders that moved toward exclusivity than in any previous revision of the DSM. Tightening of diagnostic criteria was accomplished most commonly through two types of revisions: the addition of duration requirements and the addition of age requirements. A host of disorders received new duration requirements. Most of the Learning Disorders, Anxiety Disorders, and Sexual Dysfunctions that did not previously have duration criteria must now last at least six months according to the DSM–5. It seems that this change represents an intentional effort at tightening diagnostic thresholds because the addition of duration requirements is one way to ensure a certain level of clinical significance among individuals who manifest the symptoms of a disorder (Bögels et al., 2010; LeBeau et al., 2010; Segraves, 2010; Whittchen et al., 2010). The second most common type of exclusionary revision occurred with age requirements. Many of the Neurodevelopmental Disorders added age requirements for onset that were implicit in the previous editions of the DSM. Taken together, these results suggest that the trend toward expansion of diagnostic criteria has slowed, but it must be recalled that the results only apply to disorders that have remained constant across editions; new diagnoses are a completely separate matter.

The inability to account for expansion in the form of new disorders or disorders that underwent complete revisions is one limitation of the current research. In terms of new disorders in the DSM–5, Disruptive Mood Dysregulation Disorder, Hoarding Disorder, Excoriation Disorder, and Binge Eating Disorder had no direct equivalent in the DSM–IV–TR (Binge Eating Disorder was previously in the Disorders for Further Study section). These disorders have varying potential to expand the concept of mental disorder. Hoarding Disorder and Excoriation Disorder will likely be diagnosed in less than 2% of the population (American Psychiatric Association, 2013), and they require the type of extreme, observable behaviors that will likely prevent diagnostic inflation. Binge Eating Disorder also has a prevalence rate below 2%, but that will likely make it the most common of the three major eating disorders (American Psychiatric Associating, 2013; Stice et al., 2013). Given the many normal variants of binge eating, there is a potential for overdiagnosis of Binge Eating Disorder. Of all the disorders, Disruptive Mood Dysregulation has the greatest potential to cause

diagnostic inflation; the disorder is intended to end the faddish overdiagnosis of Bipolar Disorder among temperamental children (Frances, 2013; Paris, 2013). However, the temper tantrums that make up the main symptomology of Disruptive Mood Dysregulation Disorder are less severe than mania, and this makes it possible that even more children will end up with a diagnostic label for their misbehavior.

Disorders that were completely revised in the DSM–5 are also unaccounted for in the current review, but several of them seem to represent expansions as well. Autism moved toward a spectrum diagnosis designed to cover a wide range of symptoms. Some clinicians have expressed concern that high functioning individuals formally diagnosed with Asperger's Disorder will not meet the new criteria, and early epidemiological research provides some support for that notion (Matson et al., 2012). However, the new Autism Spectrum Disorder combines five previous DSM–IV–TR disorders, eliminates certain language symptoms, and makes age requirements more inclusive. With these changes, the DSM–5 framers have intentionally expanded the diagnosis of autism to include a broader spectrum of behaviors. The Substance-Related disorders of Substance Abuse and Substance Dependence were also combined into one disorder. The revision of these disorders may actually produce a net decrease in prevalence because it eliminated the extremely low-threshold diagnosis of Substance Abuse, which required only a single, recurrent symptom. However, some have expressed concern that the new diagnosis will expand the DSM disorder intended to represent the concept of addiction to include individuals with non-pathological substance-use problems (Martin et al., 2011). To illustrate, craving and tolerance are now sufficient symptoms for diagnosis, and these symptoms are likely to apply to a huge number of regular substance users that, nonetheless, have no major substance-related problems. A final set of major revisions worthy of discussion is the Somatic Symptom Disorders, which were largely transformed into two diagnoses, Somatic Symptom Disorder and Illness Anxiety Disorder. These new disorders represent, respectively, distress about physical symptoms of illness and distress about health in the absence of symptoms. Many researchers have argued that these new disorders lack validity and will be applicable even to individuals with legitimate and normal concern over serious medical problems (Brakoulias, 2014; Frances and Chapman, 2013; Häuser and Wolfe, 2013; Starcevic, 2014). Although the DSM–5 taskforce chair defended the manual against accusations of expansion by saying the revision would be the first not to increase the number of disorders (Kupfer, 2012), diagnoses such as Somatic Symptom Disorder illustrate that expansion of the concept of mental illness can occur even when the total number of diagnoses goes down.

Why is the DSM expanding? Proponents of the DSM tend to emphasize the fact that revisions are driven by expansion of knowledge about disorders (Michels, 2013; Regier et al., 2013). They also argue that expansion of the DSM represents medical advancement because it reduces people's suffering through the identification and

treatment of previously overlooked psychological problems. By way of an analogy, hypertension could be seen as an expansion of the concept of disease, but the diagnosis and treatment of hypertension has assisted people in living healthier lives and avoiding later heart problems. In contrast, critics of the DSM argue that motivations for expansion are not primarily altruistic or empirical. According to the critics, expansion is largely caused by the financial and professional benefits to be had by diagnosing and treating an ever-increasing number of people (Francis, 2013; Horwitz, 2007; Houts, 2002). Continuing with the hypertension example, having an official medical diagnosis for elevated blood pressure results in recognition for physicians who have expertise on the condition, more funding for research on the topic, and increased profits from treatment. Despite their differences, both DSM proponents and critics can probably agree that a host of scientific and nonscientific factors have led to expansion of the DSM; their main area of disagreement is the relative impact of those factors.

Although the results of this study are consistent with several lines of previous research, it is important to note the limitations of the coding method utilized in this review. There was inherent subjectivity in the method. The coding results represent an expert conceptual analysis, but they do not have the weight of objective, empirical data. Another limitation of the review method was the equality with which all revisions were treated. All revisions affected ratings of inclusivity or exclusivity by one unit (i.e., 1 or –1) regardless of their potential effect on prevalence. For example, reducing a disorder's required duration by a month would receive the same code as eliminating the duration requirement altogether. As the example makes clear, not all revisions receiving the same code will have equivalent effects on prevalence. However, judging the practical effect size of revisions on prevalence is only possible through epidemiological research, which was not the purpose of this review.

Conclusion

The fifth edition of the DSM continues the established trend toward diagnostic expansion. Revisions to the manual tended to expand diagnostic criteria to allow more individuals to meet the criteria for mental disorders. Although the trend toward expansion was smaller than in previous editions, the cumulative effects of expansion are not trivial. Epidemiological research has begun to place lifetime prevalence rates of mental illness above 60% among young adults, and this has led to the entirely serious conclusion that "psychiatric illness is a nearly universal experience" (Copeland, Shanahan, Costello, and Angold, 2011, p. 252). Should mental and physical illnesses be considered equivalent such that everyone experiences them at some point in their life? The current research offers no answer to this difficult question, but it does illustrate the process by which mental disorders are becoming universal.

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Intentionality and the Aristotelian–Thomistic View of Concepts

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In this paper we describe the problem of intentionality for modern theories of concepts and propose that taking an Aristotelian–Thomistic (A–T) approach to concepts helps to alleviate this problem. We begin by describing some recent problems within the psychological literature on concepts that might lead one to adopt an A–T approach to concepts (see Spalding and Gagné, 2013). We then discuss Quine's dilemma of intentionality and show how that dilemma plays out across a number of possible approaches to philosophy and psychology including psycho-functionalism, the current default philosophy of psychology. We then describe how the A–T approach to concepts deals with the problem of intentionality and suggest that it may provide a better way of thinking about intentionality than other modern approaches. We end by discussing some possible objections to the approach. We show that the A–T approach is, perhaps, surprisingly compatible with other recent work in psychology and that taking this approach to concepts and intentionality does not introduce Cartesian problems of dualism into modern psychology.

Keywords: intentionality, Thomas Aquinas, psycho-functionalism

Concept formation is a foundational process for cognition. Concepts allow us to perceive individual objects as members of a kind, to attribute properties common to the kind to the specific individual object, to communicate with others

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about such objects, and so on. Indeed, concepts are often thought of as the building blocks of cognition (Solomon, Medin, and Lynch, 1999). Thus, weaknesses in theories of concepts will propagate throughout our understanding of cognition as a whole.

In recent years, despite a great deal of empirical work investigating how concepts are learned and represented, a concern has begun to arise that our theoretical views of concepts are deeply inadequate. Indeed, Machery (2009) has suggested that the theoretical confusion is so great that scholars should seriously consider the possibility that there can never be a theory of concepts.

Why this pessimism about the possibility of a theory of concepts? There are three general theoretical approaches to concepts (exemplars, prototypes, and the theory-theory), all of which are supported by empirical data, but which appear to be completely incompatible with each other. Furthermore, quite a lot of recent research results are not compatible with any of the three theories. For example, research giving rise to data that does not fit any of the standard approaches has been conducted on generics (statements that are taken as generically true of a kind, even if infrequent, e.g., Cimpian, Brandone, and Gelman, 2010; Cimpian, Gelman, and Brandone, 2010; Graham, Nayer, and Gelman, 2011), psychological essentialism (a belief in categorical essences, e.g., Gelman 2003, 2004), and k-properties (properties that seem to directly reflect the kind, see e.g., Prasada and Dillingham, 2006, 2009). For example, none of these results fits well (or at all) with the kind of statistical accumulation that underlies exemplar and prototype theories. In short, the wide array of apparently mutually incompatible experimental results, as well as being incompatible with the general theories of concepts, points strongly to the need for a very different kind of theoretical foundation for our understanding of concepts.

Recently, Spalding and Gagné (2013) proposed that an Aristotelian–Thomistic view of concepts might provide a good underlying theoretical approach to the psychology of concepts. They described the A–T view of concepts, showed that the A–T view is not the so-called classical view of concepts that was rejected in the 1970s and 1980s, and then showed that the A–T view is consistent with the empirical evidence for each of the three main modern theoretical approaches, as well as a number of other recent empirical research results that do not fit well with any of the three general theories. One of the critical points made by Spalding and Gagné is that the A–T approach to concepts is, in many respects, driven by the broader A–T approach to knowledge and by A–T metaphysics. Therefore, adopting the A–T approach to concepts may lead to solutions (or at least interesting approaches) to some other problems that are related to concepts and to philosophy of mind, more generally. In this paper, we expand on Spalding and Gagné's claims by considering how adopting an A–T approach would impact our understanding of the intentionality of human thought.

Intentionality in Philosophy and Psychology

Intentionality is the property of human thoughts such that thoughts are about or refer to or are directed toward something beyond themselves (see, e.g., Feser, 2006, pp. 15–16; Madden, 2013, pp. 12–13). Recent discussions of intentionality largely originate in the work of Brentano (1874/1973). Despite various reservations about the details of Brentano's claims that need not concern us here, discussions of intentionality have been central in both analytic (e.g., Quine, 1960) and phenomenological philosophy (e.g., Husserl, 1900/1970). Indeed, intentionality has been an extremely difficult problem in the philosophy of mind. The central difficulty is that it is very difficult to see exactly how a characteristic like intentionality could arise from purely physical antecedents, and indeed Brentano claimed that intentionality was flatly irreducible to the physical. According to Quine (1960), one must accept one horn of the following dilemma: either one accepts that thoughts have intentionality (thus giving up on physicalist, reductionist philosophies) or one accepts physicalist, reductionist philosophy (thus giving up on intentionality).

There have been a number of responses to this dilemma. Some have happily chosen the pro-physicalist horn of the dilemma (e.g., Churchland, 1986), and have thrown out intentionality (along with any other intentional or mental states such as belief) as purely epiphenomenal. Still others have attempted to avoid the dilemma by finding some way to reduce intentionality to the physical (e.g., Fodor, 1987) without taking the further step of declaring that intentionality is epiphenomenal, though none of the solutions has won widespread support. As Gallagher and Zahavi (2008, p. 110) put it, "The assumption has consequently been that you either naturalize intentionality by downward reduction of intentional states to behavior, neurophysiology, and ultimately physics, or you argue that such reduction is impossible and then conclude that the intentional vocabulary is empty talk and should be eliminated from our scientific discourse."

Others have accepted that physicalist philosophy must be abandoned (such as some of the phenomenologist philosophers and psychologists, see Gallagher and Zahavi, 2008, for discussion), as intentionality is too important to give up. A phenomenological approach to intentionality attempts to provide a descriptive analysis of the structure of conscious thought and the intentionality that this involves. Notably, this involves the philosopher or psychologist in investigating the relation of mind to the world, rather than mind to the brain (Gallagher and Zahavi, 2008, p. 111).

Another approach is to accept that the horns of the dilemma describe two completely different aspects of reality (e.g., Chalmers, 1996, 2010), one physicalist and one not reducible to the physical, essentially accepting a quite Cartesian kind of dualism. In particular, this property dualist approach divides thought into "easy"

and "hard" aspects, with the easy aspects being directly explainable in functional, physicalist terms, and the hard aspects being real, but not explainable in physicalist terms. The easy aspects include many common psychological characteristics or aspects of cognition, such as memory, perception, or judgment, while the hard aspects are those that are generally considered subjective, such as the personal experience of pain or of knowing. Notably, much of the hard aspect of thought also has to do with its intentionality.

In short, intentionality is still a very live, and a very difficult, issue in philosophy of mind. Although the psychologist interested in concepts can (and usually does) go about her work without worrying greatly about these foundational philosophical disputes, it is clear that in doing so, psychologists are simply ignoring Quine's dilemma, and that failure to resolve the dilemma is ultimately a problem for a coherent theory of concepts. It is also clear that none of the approaches above is completely satisfactory for all of psychology.

Most psychologists interested in concepts are unlikely to chose the pure, pro-physicalist horn of the dilemma, as that would mean that the very concepts they are studying are not, in fact, concepts of anything. Such concepts would have no actual content; they would not in fact be about anything at all. At the same time, many psychologists (when asked) would be likely to say that they hold a physicalist view — all concepts will eventually be reduced to something about the brain — but very possibly without realizing that such reduction likely means the elimination of the aboutness of the concept. Indeed, many psychologists tend to equate being "scientific" with holding a physicalist philosophical approach to all such questions. Thus, they are left with simply hoping for someone to accomplish a non-eliminative reduction of intentionality to the physical. In the meanwhile, they take intentionality as a given. Unfortunately, though, this means that there is no explanation for the intentionality that they take to permeate the concepts that they so rigorously study. Nor are many psychologists comfortable with the idea that there is a simple dividing line running through thoughts such that some are physical and some are not. Property dualism, when spelled out, divides psychology into "scientific" psychology and "nonscientific" psychology, rather than presenting a unified field of psychological knowledge.

We intend to show that the aboutness of a concept (and, mutatis mutandis, thoughts in general) falls out of an A–T approach to concepts. Given Spalding and Gagné's (2013) previous claim that the A–T approach could be fruitfully applied to empirical research on concepts, we will argue that adopting the A–T approach may provide a useful way of understanding intentionality in such a way that a coherent theoretical framework for concepts can be developed that extends from a metaphysical foundation through experimental results.

To show this, we will review previous approaches to the philosophy of science as applied to psychology and show that these approaches are not sufficient to ground intentionality. We will then briefly describe the A–T view of concepts,

and place it in the context of the A–T model of knowledge and truth. In so doing, it will become clear that intentionality falls out of the A–T approach to knowledge, rather than being a separate characteristic of thought that requires its own explanation. We will end by describing some of the ways that the A–T approach is compatible with the scientific approach that psychologists generally take, arguing that giving up on a pure physicalist philosophy in favor of hylomorphism and A–T metaphysics does not mean giving up on a meaningfully scientific approach to psychology.

Philosophy of Science in Psychology

The ontological and epistemological philosophical underpinnings of psychology from the late 1940s up until the late 1960s was operationism, a derivative of logical empiricism (Ayer, 1936). Though discussed in the 1930s (Stevens, 1935), operationism was elaborated by McCorquodale and Meehl in 1948 as an explanation, in terms of philosophy of science, for the psychological constructs (hypothetical constructs) of motivation, intelligence, and learning. Later, Chronbach and Meehl (1955) expanded the meaning of hypothetical constructs via the principle of construct validity and the idea of the nomological network. They claimed that the meaning of a construct, such as intelligence, is established by its ability to predict behaviors and by its interaction with other constructs in a network of functional relationships. Although most psychologists working or trained during that time rarely appeared directly aware of operationism as the philosophical undergirding of experimental work, still these ideas were present in theory building and explanation.

Logical empiricism came under heavy attack within philosophy during the 1960s and was discredited. Noting this decline, some psychologists and some philosophers interested in behavioral science proposed alternative ontological/epistemological positions. Over time, three took shape: social contructionism (Gergen, 1994), hermeneutics (Messer, Sass, and Woolfolk, 1988; Taylor, 1985), and scientific realism (Meehl, 1991). Of the three, scientific realism remains the preferred, if poorly understood, default position for most psychologists because this view maintains the claim that objective knowledge is possible. For example, Meehl, commenting on research on the "g" factor of intelligence, claimed "g" as something real existing in the subjects studied, as predicting and explaining their cognitive behavior, and as being confirmed by observation. The reader will note that scientific realism retains elements of logical empiricism.

At about the same time, psychology rediscovered "the mind," and the cognitive revolution began. Scientific realism continued as the preferred overall ontological/epistemological viewpoint of cognitive psychology; however, scientific realism made only truth and ontological claims about psychological reality, namely, that cognitive constructs a) are real and exist in subjects and b) that these discoveries

can be known. However, scientific realism did not provide an underlying explanation of the mechanisms and interactions of cognitive constructs. That became the task of functionalism, specifically of psycho-functionalism.

Psycho-functionalism

In her review, Levin (2013) points out that functionalism has antecedents (Ryle, 1949; Turing, 1950; Wittgenstein, 1922/1953) but emerged as a definitive philosophical position in the last 35 years of the twentieth century. Several major strains of this position developed: machine functionalism, psycho-functionalism, and analytic functionalism. So, far from being monolithic, functionalism itself is divided, with arguments in favor of and attacking the various strains. Psycho-functionalism is the variation most closely tied to cognitive psychology, so only that theory will be discussed.

Psycho-functionalism maintains that mental states and processes are entities (constructs) that are defined by the role they play in cognitive psychological theories. They may be tied to brain structures and processes but this is not a requirement. However, there does seem to be a trend toward attempting to ground these constructs in neuroscience (see Stedman, Hancock, and Sweetman, 2009). They can include mental states and processes easily identified with common sense (folk psychology) or they can go beyond common sense to incorporate more refined constructs identified by laboratory findings. Psycho-functionalism can also exclude or seriously question folk psychology ideas if research findings contradict those ideas.

Contemporary cognitive psychology is replete with theories grounded in psycho-functionalism expressed as models and/or mechanisms: for example, perceptual binding (John, 2002), working memory (Baddeley and Hitch, 1974), category formation (Smith, Patalano, and Jonides, 1998), and so forth. Some theories assume that there are direct ties from functional mechanisms to brain structures and processes and others do not. All postulate multiple mental states and processes that interact and play definite roles in the theory. In many cases, psycho-functional cognitive theories compete, and their truth claims are to be settled by empirical observation. As pointed out above, this is the case with concept formation.

In summary, scientific realism is the default position of most psychologists, including cognitive psychologists. Currently, scientific realism counts on psycho-functionalism to explain models and mechanisms, including the models put forth for concept formation. Regarding the problem of intentionality, the question is this: How well does psycho-functionalism account for the intentionality of human concept formation/thought?

For illustration, let's consider an example from the exemplar model of concept formation. At its most basic level, the exemplar model claims that category (concept) formation occurs when people compare new information to exemplars stored in memory. As pointed out by Hintzman (1986), exemplars are learned through repeated presentations and naming of category members (as children learn to tell

dogs from cats) and the repeated naming allows the pairing of a common name with a set of exemplars, which in turn allows generalization over those exemplars when the name (or other similar cue) is presented. It is worth pointing out here that exemplar models do not specify how people incorporate anything other than the direct presentations of the exemplars into the concept. For example, suppose you are told a definition or an exception (a whale is not a fish); how does that relate to all the previously stored exemplars, or even to new exemplars if the definitional features are not perceptible? Does the system return to each stored exemplar to update its representation? Regardless, the critical point for the current discussion is that such a system can properly generalize a name to a class of items.

Let's take a hypothetical experiment in which young children are asked to classify animals as cat or not-cat. The exemplar model, even at this simple level, would require a number of psychological constructs: sensation–perception, learning (of exemplars), many constructs in the area of memory and recall, some mechanism accounting for comparing new stimuli to exemplars, an account of language to perform the response. Because cognitive psychology is increasingly linked to neuroscience, interactions with brain structures must also be factored in. Psycho-functionalism is expected to serve as the ontological and epistemological underpinnings for this process.

In the psycho-functional model, the stimulus element is merely the initiating anchor point. The cat (i.e., the actual cat) starts the process. However, psycho-functionalism's focus of explanation is on the mechanisms mentioned above and their interaction. The response element is more important than the stimulus because it is the empirical demonstration that the model has predicted correctly. Hence, with regard to intentionality, the "what the concept is about," the psycho-functionalist epistemological/ontological account has little to say. Psycho-functionalism does start with a referent, the cat, but simply assumes the existence and knowability of cats. Most importantly, to the extent that this approach says anything about the intentionality of thought, it assumes that there are conceptual representations that arise due to the cat stimulus, and that this suffices to make thoughts of or abouwwt the cat, so long as those thoughts have those representations as content.

One might look at this description and say, "well, the exemplar is from the thing, so therefore the intentionality is accounted for" without realizing two important points. First, the "from" is basically undefined and it is unclear how this "from" actually gives rise to intentionality. That is, even assuming (as psycho-functionalism tends to do) that the representations are physically caused by the presentation of the stimulus, it is difficult to see how one physical characteristic being caused by another makes that physical characteristic about the other in the relevant sense. For example, the fact that a knife left in a fire becomes hot does not make the heat of the knife "about" the fire in the relevant sense, nor does it make the knife "about" the fire. Thus, we have to note that this way of thinking about intentionality as due to a representation being caused by the stimulus both assumes and hides intentionality. It does not explain intentionality.

The second point to be made here is that there is an issue about the mind only having access to the exemplar representation. Thus, the mind, when considering the exemplar, is ONLY accessing the exemplar representation and NOT the thing. In particular, if the concept is "that which is presented to the mind" (as has been largely held by theories of concepts at least since Locke) then the thought is about the representation, not the thing, and hence you lose any intentionality that reaches out beyond the mind. Now of course it should be obvious that there is an important difference between thinking about a mental representation and thinking about a thing in external reality, but if the conceptual representation is the content of the thought, it is very hard to see how the thought can actually be about the thing. This "problem of the bridge" and the notion that a concept is "that which is presented to the mind" will be discussed more fully in the section on the Aristotelian–Thomistic approach.

In sum, the primary epistemological/ontological thrust of psycho-functionalism is to account for and explain the mechanisms of concept formation. Hence, psycho-functionalism's account of intentionality is very minimal at best. It should be noted that the prototype and theory-theory models, also based on the psycho-functionalist ontology/epistemology, fare no better, and for exactly the same reason — the problem is one of ontology/epistemology, rather than the psychological theories, per se.

The Aristotelian–Thomistic (A–T) Alternative

Spalding and Gagné (2013) described A–T ontology in general and the application of the A–T model to concept formation in particular. The A–T framework commences with sensory information regarding objects in the environment. This information is organized by the "internal senses," including the common sense, which receives and arranges all sense data; the phantasm, which retains the sense data; the imagination, which combines and reassembles sense data from the phantasm; and the memory, which retains the sensory level images for later use. The intellect, by the process of abstraction, then acquires the universal form of the object.

It should be noted that the A–T model of concept formation calls for a second movement. For a concept to be finalized, the universal, held in the mind, must be predicated. In this second process, there is the movement from universal back down into the internal senses, the phantasm in particular. This act, known as the "existential judgment," affirms the existence of this particular dog, as in, "The dog [universal] is my dog, Tippy [the existent dog]."

Hence, the A–T model starts in the senses and sense data are processed by neural systems compatible with current neuroscience (see Stedman, 2013). Then, the faculty of the intellect abstracts the universal as a concept and returns to the particular stimulus through the existential judgment. But let us see how this model would apply to the hypothetical exemplar concept formation study described above.

Tommy, age 5, looks at a stimulus picture of a cat. This sensory information is processed by neural structures; and, in the A–T model, produces a phantasm representation of the cat stimulus. At the same time, the memory presents exemplars of cats and dogs at the phantasm level. The intellect, via the process of abstraction, then produces the form common to all cats and dogs, the blueprint or structural model as described by Shields (2003). Tommy then makes a comparative judgment involving this picture of a cat to the abstracted blueprints of dogs and cats (stored in the passive intellect according to A–T theory). Then he makes an existential judgment: this picture is like cats, not dogs. Then Tommy makes the full existential judgment to the experimenter: that (the particular stimulus) is a cat.

The A–T process, described above, offers a full account of intentionality, "what the concept is about." This might be easier to see if we leave the hypothetical experiment and consider Tommy out on the street. He sees a cat. This stimulus enters his sensory/perceptual system and becomes available for comparisons to abstractions of cats, dogs, raccoons, and other four-legged animals. Tommy, after comparison, makes an existential judgment about the stimulus that started the process: "Oh, see that cat." This judgment regarding the stimulus that started the process completes the intentionality circuit. The A–T process starts with and affirms the existence of a particular cat; psycho-functionalism simply assumes the cat is there.

The critical distinction is not that Tommy makes such judgments or behaves in such a way (obviously, Tommy's behavior does not depend on which theory psychologists adopt!). Instead, the critical distinction revolves around the question: Why does the A–T view warrant such behaviors while psycho-functionalism does not? This difference depends on two aspects of the theories that go beyond the simple description we have given above, and into the metaphysical assumptions and claims of the views. First, in the psycho-functionalist view, the concept is the content of the thought; the "that which" the mind grasps. This creates a clear issue for how one can connect to anything outside the head (this is sometimes known as "the problem of the bridge"). In this case, there is a difficult gap that directly relates to how the thought can be about the thing outside the head, if the content of the thought is the concept. This gap, in turn, opens the door for a radical skepticism. In the A–T view, on the other hand, a concept is not "that which" the mind grasps, but "that by which" the mind grasps something; the concept is not the content of the thought. Instead, the concept is just what allows the mind to grasp the form or nature of the thing; the mind's grasp of the thing in the world is supported by the abstracted species of the thing, plus the phantasms and other sensory information as described above. But none of these is what the thought is about; they are what allows the thought to be about the thing.

Second, the A–T view describes the concept in this way, not as a response to the problem of the bridge, but based on the A–T view of form and matter, which was independently motivated by metaphysical concerns. In particular, in the A–T view of form and matter, the form that is abstracted by the human mind is the same form as

that "in" the thing, though existing in an intentional mode rather than in the matter of the thing. Thus, there is a direct link of the A–T thought to the form of the thing, and this provides or creates the aboutness of the thought. Psycho-functionalism cannot avail itself of the same approach, as psycho-functionalism does not include the matter/form distinction in its philosophical description of the things in the world.

Adopting an A–T approach to intentionality not only links to A–T metaphysics in terms of form and matter (and thus the inherent intentionality across both sensory and intellectual operations), but also in terms of the A–T approach's metaphysical analysis of causality. In particular, in the psycho-functionalist approach, there is a difficult question concerning why intentionality should arise from a fundamentally mechanistic world. Indeed, intentionality, in the psycho-functionalist view, seems to arise purely as a function of the existence of mind, without any precursors in the world, and without any obvious explanation in terms of anything beyond the mind itself. In the A–T view, on the other hand, intentionality as aboutness is a characteristic of sensory and intellectual operations and hence of minds, but it is also connected to the A–T principle of finality (i.e., final causality), by which there is a "directedness" at all levels of the world. Thus, intentionality in the narrow sense (i.e., as the aboutness of a thought) arises only for minds (including sensory-based, nonintellectual minds of animals), but the broader characteristic of directedness is one that exists throughout nature in the form of final causes. So, intentionality is the specific form of directedness that minds are capable of, rather than a completely new and mysterious power that only exists to explain the apparent nature of our thoughts. Feser (2014, Ch. 2, and particularly pp. 100–105) provides an in-depth discussion of intentionality and finality in the A–T view, as compared with recent attempts by analytic philosophers to extend mental intentionality into the physical realm in order to deal with some of the problems associated with a mechanistic view of the world, a kind of reversal of the structured relation between claims about mind and world found in the A–T approach.

The fact that the A–T view of concepts derives directly from its view of things in the world and ultimately from its metaphysical commitments, and that it is this difference that accounts for the inability of the psycho-functionalist view to account for intentionality in a similar way, might raise concerns that adopting the A–T view (and with it, the "intentionality" horn of Quine's dilemma) will make it impossible to have a real science of psychology. Indeed, the real difficulty in Quine's dilemma appears to be exactly that giving up on the physicalist horn means losing the ability to do science in this area. However, we would argue that the A–T model, compared to the psycho-functionalist model, actually offers a much better defense of scientific realism.

As noted previously by Meehl (1991), scientific realism holds that the scientific method produces knowledge that is objective and about real entities existing in real people (subjects), concepts in our case. While it is true that this objective knowledge might change over time based on new findings, still the claim of objectivity and

existing entities holds. Psycho-functionalism does attempt an objective description of the entities within the person, with ties to brain functions; however, as pointed out by Spalding and Gagne (2013), it fails to be able to discriminate which theory is superior and fails to present a solid link back to environmental stimuli, an essential for scientific realism. The A–T model, as elaborated above, fulfills all the requirements of scientific realism: a) a clear-cut initiation in the senses with ties to brain function, b) a description of entities within the concept formation process that binds together all the psycho-functionalist theories of concept formation, and c) a return to knowledge of the initiating stimulus via the existential judgment. Finally, we should note that from the A–T perspective, Quine's dilemma is a false one, precisely because the physicalist horn of the dilemma assumes a world without final causality, and hence without the directedness that is inherent in the A–T principle of finality.

Of course, the propriety of adopting the A–T perspective is controversial, despite our argument above that the A–T view meets the needs of scientific realism. Many believe either that modern science has shown that there are nothing but efficient causes, or that modern science would be undermined by admitting the possibility of the other causes, even if such causes have not been shown to be non-existent. Recent work, however, should at least partially undermine such beliefs. A detailed defense of the A–T view as a superior foundation for science compared to other modern philosophical approaches is far beyond the scope of this article, but can be found in Feser (2014), and particularly for the study of the mind, in Madden (2013). A few issues are worth considering here, however.

The first point above, that science has shown that only efficient causes exist, is simply not true. Indeed, such a claim is something that cannot be shown by science, but could only be established via philosophical argument because, by hypothesis on this view of science, science can only investigate efficient causes, and thus has no way of proving or disproving the existence of any other cause. It is important to understand that science's turn to exclusively efficient causes was based on a methodological assumption, rather than being based on the results of scientific investigation (and, this assumption was, itself, often motivated by concerns outside the needs of the science, see e.g., Burtt, 1925). Now, one might believe that the success of science in using efficient causality is a kind of argument for assuming that only efficient causes exist. But, that is far from a demonstration (and, of course, it does not logically follow, because the fact that science has found out many things about the operation of efficient causality in the natural world does not in any way entail that it has missed nothing about other kinds of causality). As Feser (2014, pp. 23–24) points out about this conception of science, despite its successes ". . . it simply does not show us that those aspects exhaust nature, that there is nothing more to the natural world than what the method reveals."

In terms of the second point above, that science would be undermined if any causes other than efficient causes were actually to exist, it is unclear what evidence

or argument supports this claim. Feser (2014, Ch. 2) provides a very detailed exposition of the four causes and particularly the role of final causality in understanding the natural world. Madden (2013, Ch. 7) provides a more accessible description. We wish to emphasize four aspects of the relation between the A–T view and modern science. First, as described by Feser (2014, pp. 91–100), there are serious arguments that efficient causality itself must be embedded within a system of final causality in order to guarantee the necessity of the outcomes of efficiently causal systems, and (pp. 101–105) some modern analytic philosophers are independently re-affirming this connection by proposing the necessity of new metaphysical entities that appear to be closely related to A–T final causes. Thus, there are current, serious arguments being made for the necessity of final causes, not all by people from the A–T tradition.

Second, in understanding how efficient causes might require final causes, it is important to remember that the A–T view does not presume that final causes take the place of efficient causes. Instead, all of the four causes are seen as necessary for a full understanding. Furthermore, the A–T view assumes that final causes play out via efficient causes. Thus, there is an asymmetry between the A–T and mechanistic approaches to nature, in that the mechanistic approach must establish that efficient causes are sufficient to explain everything, while the A–T view only needs to show that the other causes are necessary in addition to efficient causes (see particularly the discussion in Feser, 2014, pp. 92–98). Indeed, in the A–T view all the causes work together in a tightly integrated way in any physical event.

Third, it is important to remember that in the A–T view, the role of final causality in the world need not presuppose anything "supernatural." For example, while the A–T view claims final causality in natural objects (e.g., that an acorn "points to" an oak), this final causality is embedded in the nature of the thing itself (the formal and material causes) and plays out (or not) via efficient causes. Thus, final causality need not presume a directing intelligence, a common concern among those who believe that final, formal, and material causes undermine science. Note, in fact, that the worry that there must be a directing intelligence for there to be any finality, is actually yet another effect of our modern, deep assumption that all causes are efficient — in other words, we believe there must be a directing intelligence because we feel that we need some other (efficient) cause to push the events in the proper direction. But this is largely because we are used to thinking of all causes as efficient, not because there is some inherent need for a directing intelligence to guarantee finality.

Finally, as Madden (2013, p. 251) points out, "remember that the Aristotelian does not arrive at this view as an ad hoc attempt to gerrymander an account of nature around our commitments in the philosophy of mind." Instead, the A–T analysis of the causes (and of the form/matter distinction) is developed precisely to understand the natural world at the most basic metaphysical level, and its application to man is to man as part of that natural world. In this sense, as mentioned above, intentionality falls rather naturally out of independently motivated metaphysical com-

mitments in the A–T view. There is no good reason to believe that these metaphysical commitments will undermine science as a method or as a process of knowing the world. They will, though, tend to undermine strictly mechanistic metaphysical views, and an associated "scientism." However, science as a method and process need not require such "scientism" as a metaphysical commitment. Indeed, there are strong arguments that "scientism" (if it were to be rigorously accepted and applied) actually undermines science (see, e.g., Feser, 2014, pp. 6–28).

Objections to the A–T Model

Spalding and Gagné (2013) dealt with a number of problems that had previously been attributed to "classical" views of concepts by showing that such problems were primarily based on a misunderstanding of the Aristotelian (and Thomistic) views of concepts. Here we will focus on two other kinds of objections that are likely to immediately arise when one considers the A–T view with respect to intentionality from the psychological and philosophical perspectives. From the psychological perspective, the question that immediately arises is why a more complicated view (such as the A–T view) should be needed in order to understand concepts at all. From the philosophical view, the question that immediately arises concerns whether the A–T view is going to suffer from the well-known interaction problems associated with dualism.

Non-human Animals Discriminate Kinds without Requiring an A–T Intellect

One objection that might be raised to the A–T model is that it seems that all that is required for a good theory of concepts is to be able to account for people's ability to discriminate between classes of objects, and that correct discrimination thereby ensures that the thoughts that relate to that discrimination have all the intentionality that is needed. Furthermore, one might claim that research with non-human animals shows that human and non-human concepts are both simply the result of discrimination learning, or associative learning more generally. Hence, not only is there no need for a special, intentional way of thinking about human concepts, but even the broader A–T idea of a distinction between sensory and intellectual powers is proven to be wrong. There are several points that could be made in response to this objection, but we will limit ourselves to two.

First, human cognition involves far more than just discrimination, as concepts feed into reasoning, for example, in ways that are at the very least not yet shown to be true for non-human animals. While humans can, in appropriate circumstances, respond in ways similar to non-human animals, they often do not. For example, recent research on risky decision-making has shown a very interesting pattern of both continuity and discontinuity with non-human behavior. In particular, when risky decisions are based on descriptions (e.g., Kahneman and Tversky, 1979), humans

show a marked bias to be risk averse in seeking gains, but risk seeking for losses. In short, the person treats the smaller gain or loss as a kind of given, and does not want to risk losing the gain, but will risk a larger loss in order to "get rid of" the initial loss. However, if the analogous risky behavior is examined in the context of decisions from repeated experience (e.g., Ludvig, Madan, and Spetch, 2013), then the risk preferences reverse, and in this task human risk behavior looks just like non-human risk behavior. The interesting points, of course, are that a) there is a clear continuity between non-human and human risky decision making from experience and yet b) there is also a clear discontinuity in that the human decisions from description cannot be a result that "builds up" from the experience of making individual risky decisions, as the risk preference reverses. That is, the pattern of behavior in the decision from description task is not one that results from simple associative learning over many trials: it is not simply a generalization of previous risky decisions. Instead, the reasoning process in the human is quite different and must, in some way, override the associative learning that has presumably built up over the person's exposure to individual risky decision experiences.

Second, given the A–T approach's insistence on the continued involvement of the sensory powers in all human thought that relates to particular items, and given the A–T approach's insistence on the continuity of sensory powers between human and non-human animals, one should expect that the A–T approach might have some interesting things to say about the relationship between human and non-human cognition. As it turns out, the similarity between human and non-human animals' discrimination learning is actually a strength of the A–T approach. Thomas Aquinas, for example, is very clear that humans and non-human animals share a sensory power (the estimative or cogitative power) that allows the organism to respond to kinds of objects without the distinctively human power of the intellect. Note also that this view includes a version of intentionality of those sensory-based "thoughts" in both human and non-human animals. Thus, the A–T approach, in comparison with those approaches that derive from a more Cartesian dualist approach, provides a more reasonable way of accounting for both the continuities and discontinuities between human and non-human cognition.

Is the A–T Model the Same as Cartesian Dualism?

A more philosophical concern that one might have is that the A–T model, with its discussion of form and matter, re-introduces the kinds of problems associated with Cartesian dualism. On the contrary, there are many advantages to the A–T view, but one conspicuous one is that it avoids the problem of interactionism that Descartes (and his descendants) suffer, despite the fact that the A–T distinction of matter and form is sometimes thought of as a kind of dualism. Descartes generates a problematic dualism because he tries to understand the soul–body relationship in terms of efficient causality. That is, the soul relates to body as an altogether

separate substance that nonetheless seems able to influence the body. In other words, for Descartes, the soul is a separate substance somehow affecting or otherwise colliding with the body (like billiard balls striking each other). But how can this interaction take place? The difference between a non-physical substance and a physical substance seems to preclude a cause–effect relationship between them.

There are (at least) two related and critical differences between this Cartesian understanding and the A–T view. The Cartesian mind/matter distinction is, in fact, quite different from the A–T form/matter distinction. First, the A–T view is very clear that mind and body are not two separate substances. Instead, the person is one substance made up of form (soul) and matter. Indeed, the A–T view is clear that "primary substances" are ordinary individual things, all of which consist of form and matter, so this is not something unique about humans. Thus, the Cartesian "thinking substance," the mind, is not actually comparable to the A–T soul (form) at all. It is particularly important in this context that the A–T form (soul) is not what does the thinking, in direct contrast to the "thinking substance" of Descartes. In the A–T view, there is no separate immaterial thinking substance. Instead, there is a thinking person and thinking is a function of form and matter in combination. The distinction being drawn is, in short, a completely different kind of distinction in the two views.

Second, although the views appear to share something called "matter," the nature of matter is really very different in the two views. Descartes' interactionist troubles arise in large part due to his mechanistic view of matter, such that only efficient causes are to be admitted. Thus, the Cartesian soul must have some way of acting as the efficient cause of bodily actions and effects. Similarly, there is a real difficulty in understanding how the body can affect the "thinking substance" of the mind — how can a physical, efficient cause have any impact on an immaterial thinking substance? How is it, for example, that a brain injury affects a person's ability to think? However, if, with the A–T view, one understands the soul as a formal rather than efficient cause, the soul–body composite becomes a unity. Instead of the human person consisting of two distinct entities, whose interaction becomes a puzzle, the human person is a unified entity, consisting of soul and body. The soul (the form of the body) actualizes the body to be specifically human. In light of this formal causality, the soul and body become two aspects of a single, unitary human being. Thus, the problem of interaction is avoided: there is one entity actuated by its form (soul or life principle), instead of two altogether different substances trying to interact. The soul affects the body, not via efficient causality as one billiard ball striking another, but via formal causality. Similarly, there is no difficulty in understanding that bodily injury, illness, drunkenness, strong emotions, and other bodily factors affect the ability to think, a point made repeatedly by both Aristotle and Thomas Aquinas, because thinking just is a function of the combined body and soul (form). Rather than a substance dualism, the A–T model, at the level of the individual person, is a kind of "uniformism" due to this distinct causal and metaphysical analysis.

Conclusions

Intentionality, the aboutness of human thought, is a deep and abiding puzzle in both philosophy and psychology. Intentionality in concept formation, what the concept is about, is in need of thorough explanation in order that the intentionality of the rest of human thought can be understood. We have argued that psycho-functionalism, the current ontological–epistemological underpinning of cognitive psychology, fails to address intentionality adequately. We claim that the A–T model offers a better account of intentionality and, in addition, is fully compatible with scientific realism, the ontological–epistemological philosophy of science espoused by most behavioral scientists. Finally, we have addressed some objections that might be raised against the A–T model, particularly the objection that the A–T model is equivalent to Cartesian substance dualism.

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Conservatism and Pragmatism in Law, Politics, and Ethics. Seth Vannatta. London and New York: Palgrave Macmillan, 2014, 296 pages, $95.00 hardcover.

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Seth Vannatta's aim in *Conservatism and Pragmatism*[1] is to "unsettl[e] current discourse and ideological confusion by presenting a broad comparison of two traditions" of thought and practice, with an eye towards synthesizing their respective insights and strengths (p. 2). This project springs from the author's sense that the various and conflicting academic and popular characterizations of conservatism and pragmatism — treating them at times as dispositions, at other times as programs or ideologies — have left both in need of thoughtful reconstruction and clarification. While Vannatta is not alone in seeking to map the souls of conservatism and pragmatism, his effort to bring the two into systematic, mutually-informing conversation is distinctive and valuable.

The cornerstone of Vannatta's approach is to treat conservatism and pragmatism as "methods" of solving concrete problems, both practical and theoretical, that are "guided by various common norms" (p. 2). He suggests that, properly understood, conservatism and pragmatism are skeptical, fallibilist responses to Enlightenment doctrines of rationalism and human perfection. Both "eschew the false universalism of a priori thinking, and turn instead to localized, contextual, and experiential inquiry" (p. 3). Both counsel that thought and practice begin from and draw upon the accumulated wisdom of experience, rather than impose abstract first principles or the dictates of ideology. Custom, sentiment, and prejudice play important roles in our efforts to cope intelligently with the world, roles both more fundamental and more fruitful than speculative, abstract reasoning. The solution of problems and fixation of belief ought to proceed experimentally, moving gradually and tentatively from what is already understood or enjoyed, testing the new and provisional against the old and established. In respect of these common norms, human conduct amounts to chastened yet melioristic engagements with the world of experience through which individuals who enjoy common bodies of knowledge, institutions, and cultural achievements relate to one another as members of "an indefinite community of [. . .] inquirers" (p. 115). One of Vannatta's most interesting and fruitful claims is that conservatism and pragmatism are kindred stances, each having a congenital affinity for the attitudes and approaches of the other without entailing or reducing to the other. They are thus more satisfactory considered together than separately. Suitably combined,

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[1]Page numbers for quotations from this book will be cited parenthetically throughout.

conservatism (represented by Edmund Burke and Michael Oakeshott) and pragmatism (represented by Charles Sanders Peirce and John Dewey) provide a rigorous method of reflection, deliberation, and practice that is appropriate to the full scope of human affairs. Building from these foundational claims, Vannatta explores the implications of the conservative, pragmatist method for history, law, ethics, and politics.

In both form and substance, the book is a search for a middle ground between the extreme of arid, dogmatic rationalism that effaces the importance of human character and context, on the one hand, and mere subjectivism or relativism that makes the contingencies of character and context the whole story, on the other. Vannatta explores the affinities, as well as the distinctions, between conservatism and pragmatism by way of a series of topical discussions dealing with their origins as reactions to the excesses of the Enlightenment, their respective contributions to the understanding of history, and their applications in the domains of law, ethics, and politics. Despite its relative brevity, the book's intellectual breadth is nonetheless impressive, and its discussion is learned and engaging. The author's treatment of conservatism and pragmatism as methods rather than as ideologies yields the work's perhaps most distinctive contribution to the existing literature and its most striking insights into its subject matter. Vannatta simultaneously challenges interpretations of the conservative tradition, such as Russell Kirk's, that see it at odds with pragmatism and deepens our understanding of how classical pragmatism, in the model of Peirce and Dewey, is internally governed by conservative principles that resonate with the views of Burke, Oakeshott, and Friedrich von Hayek. This creative and ambitious approach facilitates a nuanced appreciation of how conservatism and pragmatism might inform one another and better equip us to deal with concrete problems.

At the same time, however, the breadth and ambition of the book causes troubles for its project. In order to sketch the emergence, character, and implications of conservatism and pragmatism, Vannatta devotes significant attention to the views of thinkers as diverse as Descartes and Hegel, Locke and Hume, Kant and Reid — in addition to the core thinkers who orient his understanding of conservatism and pragmatism. The intellectual generosity demonstrated in the author's careful exposition of each thinker he discusses at times affords too much space to marginal characters and dilutes the discussion of the principals. This, coupled with the author's fragmentation and distribution of core thinkers and themes across many chapters and sub-sections, renders the work wider than it is deep.

There are also shortcomings regarding Vannatta's treatment of pragmatism. One is the disappointing opacity regarding the author's choice of representative pragmatist thinkers. Like most contemporary scholars of pragmatism, Vannatta looks to the classical pragmatists, and he participates in the highly visible contemporary trend of looking to Peirce. However, unlike Richard Rorty (1982), Cheryl Misak (2000), and Robert Talisse (2007), who more or less carefully explain why they look to specific forefathers, Vannatta presents Peirce and Dewey as self-evidently appropriate representatives of pragmatism properly understood. This relative oversight does not weaken the claims of the book — Peirce and Dewey serve the author's purposes admirably — yet it squanders an opportunity to make an explicit case for the interpretation of classical pragmatism that Vannatta presents. This limits the book's capacity to influence contemporary understandings of pragmatism, and makes it more likely to serve as an introduction to the uninitiated.

Equally subtle, but potentially more problematic, is the approach Vannatta takes in his exposition of pragmatism as a method. The author goes to pains to explore pragmatism's rejection of abstraction and first principles in favor of experience, practice, and

the solving of concrete problems. However, Vannatta's characterization of pragmatism often reads as a statement of the abstract, first principles of the method of methods, one fit for all occasions. Without careful illustration of the pragmatic method by way of concrete examples, the exhortation to proceed experimentally from the wisdom of experience and practice is as thin and unsatisfying as the exhortation to adhere to the dictates of reason or natural law. Vannatta frequently gestures towards such concrete applications, but only fully delivers in his discussion of the pragmatic jurisprudence of Oliver Wendell Holmes, Jr. The discussion of Holmes's legal realism and embrace of the common law method of adjudication illustrates the method of (conservative) pragmatism, putting flesh on a conceptual skeleton derived from Burke, Peirce, Dewey, and Oakeshott. The same depth is not, to my mind, sounded in the domains of history, ethics, and politics. This is problematic because, absent such concrete development, it is not apparent that jurisprudence can afford paradigm examples of historical understanding, ethical judgment, or political deliberation. This, again, is not so much an instance of faulty argumentation as it is a missed opportunity. Indeed, the opportunity is strikingly close at hand, at least with regards to politics. Oakeshott understood politics (which he characterized as the pursuit of what our current beliefs, values, and practices intimate but do not yet manifest) on analogy to the English tradition of common law adjudication — yet this bridge to politics (or to history and ethics) is never quite built (Oakeshott, 1991).

Lastly, it is somewhat surprising that the concept of inquiry (which was the name that both Peirce and Dewey gave to the methods they self-consciously championed) does not serve as the explicit, abiding thread that connects all of the book's various topical discussions together. Not only is inquiry at the heart of classical pragmatism, it is also the clearest point of contact between conservatism and pragmatism. It is in the practice of inquiry that pragmatism embodies a conservative principle, and the practice of pragmatist inquiry is what stands to rescue conservatism from mere reaction, nostalgia, and self-satisfied nay-saying. Vannatta frequently invokes the concept of inquiry, but without either explaining the difference between the Peircean and Deweyan inflections of the concept or supplying an overarching frame that systematically accommodates the views of both. This gap leaves uncertain whether the method the book champions is the author's own or one selectively borrowed from others. It also leaves undecided whether inquiry is merely one component of the method of conservative pragmatism or the entirety of that method. A great deal hinges upon this question. If inquiry is only one element of the method Vannatta valorizes, then its role and significance can only be understood in the context of the other elements. If it is the method, then conservative pragmatism can only be adequately understood by way of a painstaking, systematic account of inquiry. While the author supplies numerous partial discussions of intelligent, contextual problem-solving, these often proceed by way of contrast with Enlightenment rationalism (and thus often say as much about what inquiry is not as about what it is) and do not ultimately add up to a systematic account of a method. Vannatta thus perhaps demonstrates the value and timeliness of inquiry more than the nature or practices of inquiry.

However, these imperfections are forgivable in a work that defends a fallible, experimental method. Vannatta, to his credit, does not purport to exhaustively or authoritatively characterize or define conservatism, pragmatism, or their felicitous marriage. If one reads *Conservatism and Pragmatism in Law, Politics, and Ethics* as an instance of inquiry, addressed broadly to some of the most perennially salient and consequential modes of human thought and conduct, then it clearly exemplifies some of the signal strengths of conservative, pragmatist inquiry. Vannatta strives to understand better what we are already doing and what, to varying extents, we already understand. The result is

an account of historical, ethical, legal, and political inquiry that neither surrenders to nor denies the conditions of context that both prompt and condition human efforts to be at home in the world. In this regard, Vannatta's work is in conversation not only with contemporary scholarship on conservatism and pragmatism, but also with thinkers such as Bryan Garsten (2006) and Adam Adatto Sandel (2014) who explore the anatomy, aspirations, and deficiencies of our Enlightenment inheritance. The lasting contributions of *Conservatism and Pragmatism* are likely to be its invitation to think of intellectual traditions in methodological rather than ideological terms, and to recognize the potential for two important modern intellectual traditions to inspire and inform one another.

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