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The infected self: Revisiting the metaphor of the mind virus

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Lloyd Hawkeye Robertson
Athabasca University, Canada

Abstract
The idea that units of culture may act as a virus controlling some of the perceptions and actions of individuals has been the subject of considerable controversy since proposed by evolutionary biologist Richard Dawkins. This debate has occurred in the absence of a defined mental viral structure or a target body upon which such viral structures may act. This article develops a paradigm in which the self is understood as such a body upon which future research into "mind viruses" may be undertaken. Possible mechanisms for mind-viral transmission are discussed. Criteria for defining a mental virus are used to examine evidence of possible mind-virus contagion in suicides, suicide cults, terrorism, and religion.

Keywords
memes, mind virus, religion, self, suicide, suicide cults

William James said, "The thought is the thinker … for if my thinking is confused, I am confused: if my thought is blocked, I am blocked" (1890, p. 401). Fredrick Nietzsche (2003) viewed thinking as potentially independent of the thinker: "A thought comes when it wishes, not when 'I' wish" (p. 17). Csikszentmihalyi's (1993) concept of "flow" depends on the notion that thoughts may independently lead to new creative associations. Barresi (2002) added, "Each thought is, in a sense, an independent being whose preferences and choices may be uniquely its own" (p. 241). If an initiating idea can generate sequences consisting of chains of cognitive and emotional reactions independent of the conscious will of the individual, it is possible that some such reactive sequences are maladaptive. Using the concept of the meme as an elemental and replicable unit

Corresponding author:
Lloyd Hawkeye Robertson, Athabasca University, Box 647, La Ronge, Saskatchewan, S0J 1L0, Canada.
Email: lhrobertson@sasktel.net

of culture, this article examines the notion that such sequences may be thought of as a mental "virus." As will be seen, this requires a combination of the Jamesian idea that we are our thoughts with the Nietzschean notion that our thoughts may act independently. Since symbiotic memes constitute our cognitive structure of self, only those that are maladaptive are considered for the mind-virus analogy in this paper.

People use culturally mediated mental representations to situate themselves in consciousness (Donald, 2001; Harré, 1998; Seigel, 2005), with the implication that the resultant self along with thinking that may be attributed to that self consists of units of culture. Various terms have been promoted to represent these cultural units including "mnemotype," "idene," "sociogene," "concept," and "culturgen" (Wilson, 1999, p. 148), but in this paper I use the more widespread term "meme" popularized by Dawkins (1976). The qualities of attraction and repulsion Dawkins posited for memes permit an evolutionary dynamic within the medium of culture. Dennett (1991) defined memes as "the smallest complex ideas capable of replicating themselves with reliability and fecundity" (p. 201), with the implication that this replication may occur without the conscious decision of the individual in whose mind such replication occurs. Goleman (2006) posited mirror neurons powered by emotions and priming as the mechanism enabling memes to propagate. Robertson (2010) defined memes as elemental units of culture consisting of (a) referent, (b) connotative, (c) affective, and (d) behavioral dimensions with overlap between these dimensions providing the apparent force of attraction between memes.

Memetic attraction has been used to explain the spread of maladaptive behavioral sequences such as suicide contagion (Marsden, 2001), suicide bombings (Dawkins, 1999), and alcoholism (Csikszentmihalyi, 1993). In the absence of an entity upon which such malevolent memes may interact, along with a mechanism by which the process may be understood, such explanations have been criticized as tautologies (Boyd & Richardson, 2000; Burman, 2012; Coyne, 1999). Yet, successful outcomes in treatment for speech and language pathology (Kamhi, 2008), marital difficulties (Fincham & Beach, 2010), suicide ideation (Robertson, 2011), and Post Traumatic Stress Disorder (Robertson, 2016) have been attributed to the inculcation of "healthy" memes to individuals seeking therapy. If a therapist can intentionally and successfully introduce new memes to the conscious self of the individual in the course of treatment, then it is conceivable that outside memes may be introduced to the self unbidden and those memes could thereby act in a viral fashion. To eliminate the tautological argument it is necessary to describe the body-like entity that may admit such healthy or unhealthy memes and the mechanism by which such changes could be made.

The modern self as a mental analogue to the body

Blackmore (1999) described the self as an interlocking complex of memes (memeplex) that survive by convincing us that they are essential to our being. This mixing of mental and physical modalities has the effect of giving both the same ontological status and thereby places the thought in opposition to the thinker who is left undefined except as a receptacle for competing thoughts. In this mechanistic view, who we come to think we are (the self) is a clever illusion by which a particular and arbitrary set of viral memes entrench themselves in consciousness, which is itself an "after the fact" illusion. There is

no room, in such a view, to make meaningful choices outside of those needed to ensure the replication of the controlling memeplex. This view, that both the self and consciousness are illusions, contrasts with Dawkins' (1976) statement, "We have the power to defy the selfish genes of our birth and, if necessary, the selfish memes of our indoctrination" (p. 215), but both views imply that the "we" who is either convinced or empowered is antecedent to and separate from infesting memes. The failure to define that conscious primal entity with the capacity to defy genetic and cultural forces leaves tenable an assertion that the very consciousness assumed is illusory, yet the idea of self-consciousness is central to our definition of being human. As Gazzaniga (2000) observed:

> A device that begins by asking how one thing relates to another, a device that asks about an infinite number of things, in fact, and that can get productive answers to its questions, cannot help but give birth to the concept of self. Surely one question the device would ask is, "Who is solving all these problems? Let's call it *me*" – and away it goes! (p. 1320, para. 16)

Gazzaniga's "device" is an evolved left-hemispheric mechanism related to language acquisition that acts as an "interpreter" in finding order, but it is dependent on the existence of sufficient conceptual understanding to ask the question he posits. While memetic replication can be understood broadly as a process of imitation (Dawkins, 1976), "Language extends the human brain into a mind which operates more efficiently because language accesses associations automatically and triggers memories more efficiently than the brain's neural nets would without the cues of language" (Logan, 2008 p. 66). In tracing an evolutionary path from two-slot grammars that could have been used by Neanderthals and our common ancestor, to hierarchical grammars possible only in hominids possessing the FOXP2 gene, Progovac (2016) lent support to the hypothesis that memes co-evolved with genes giving definition to our species (Freidman & Sing, 2004; White, 1969/1990).

If humans were simply imitators of memes, the most successful of us should be those who are able to reliably replicate memes with fidelity and fecundity. In an experiment comparing adults with and without autism, Atran (2002) asked participants to repeat common sayings such as "Let a thousand flowers bloom" or "To everything there is a season." The participants with autism repeated the memes more literally and exactly than those without autism presented with the same memes. Participants without autism would typically modify the information they were given in ways that showed associated interpretations or inference. In a related experiment (Atran, 2002), Christians were asked to write the meanings of the Ten Commandments. Despite the participants' expectations, interpretations of the commandments showed considerable variation with little evidence of consensus. It is possible that our human ancestors were reliable replicators of culturally learned memes as postulated by Blackmore (1999), but modern humans without autism have either a diminished ability to do so, or they have additional mental attributes interfering with this more primal replicative function.

Following an analysis of early Greek literature, Jaynes (1976) surmised that pre-Homeric Greeks were unable to exercise self-agency and were dependent on pre-programmed cultural responses to triggering events. Events that were not culturally anticipated led to schizophrenia-like symptoms including auditory and visual hallucinations which

were interpreted as divine messages. After examining similar data from pre-1000 BCE Greek and Egyptian cultures, Johnson (2003) said the people in these early civilizations lacked minds. He defined mind to be an evolved cognitive program that gives the brain (a) a capacity for objective beliefs, (b) a notion of individual volition, and (c) a capacity for internally consistent thought. While the respective interpretations of Jaynes (1976) and Johnson (2003) are debatable, if we understand mind to be a hybrid product of biology and culture (Donald, 2001), then new conceptualizations available through culture can affect mental processing. It would be surprising if individual selves with the capacities described by Johnson emerged full-blown at the dawn of our species. It is therefore reasonable to postulate that the modern self evolved from more primal versions.

People with such modern selves exhibit a level of consciousness not evident in people without selves, as may be found in those with Alzheimer's or autism (Damasio, 1999; Hertogh, De Boer, Dralles, & Eefsting, 2007; Uddin et al., 2008). This self, as a cultural construct, begins development in early childhood with the acquisition of language and attributions of intentionality, but is not fully developed until late adolescence or early adulthood (Harter, 2012). This self-referencing loop allows the individual to understand that other entities exist with different perspectives, and this realization allows a differentiation between the subjective and objective, the foundational elements of the Jamesian formulation. It follows that this conscious self is analogous to the body while memes and complexes of memes that are not self-referencing but nonetheless replicable and deleterious to the functioning self are analogous to viruses seeking to enter that body. Using this analogy, complexes of memes that constitute a viable functioning self are mutualists making common cause with the physical self to the replicative advantage of both. Since both mind and body constitute who we are, only those memes that exist outside that complex can be considered to be potentially viral.

It is plausible that a primal self emerged following the early evolution of language that resulted in successful humans operating as Blackmore's (1999) "meme machines." An evolved modern self would have retained many primal features. Thus, while a self-referencing autobiographical self is necessary for the notion of subjectivity and its conceptualized opposite, modern humans do not necessarily always function at this level. Nonetheless, the capacity to use reason and engage in conceptual thought, to situate ourselves temporally and engage in future planning, all of which is enhanced if not made possible by the modern self, are commonly considered to be distinguishing characteristics of being human. Thus, the modern self as conceptualized here is not a virus but is as integral to who we are as any physically evolved structure such as our oppositional thumb or color vision. But unlike physically evolved structures, the modern self is a cultural adaptation that must be learned in childhood.

Underlying mechanisms for mind-viral propagation

Dawkins (1976) inadvertently implied a kind of Cartesian dualism by treating all memes as viral. Since the self is necessarily constructed from those very memes, we become ethereal viral entities seeking human bodies to inhabit. As we have seen, Blackmore (2000, 2002) attempted to resolve this dilemma by declaring the self and attending consciousness to be illusions thus turning us into deluded automatons. If, however, we take

the perspective that mind and body co-evolved with some basic mental patterns and behaviors genetically transmitted, then who we are is defined by both our constituent memes and the bodies in which they reside.

The modern self may be understood as a self-referencing cognitive feedback loop having qualities of volition, distinctness, continuance, productivity, intimacy, social interest, and emotion (Robertson, 2010). If such a memetic feedback loop leads to notions of the objective and subjective, then it has a necessary pre-condition for situating the individual in time and space and for logical thought. Through such a mechanism we can exercise willful choice without the necessity of resorting to dualistic explanations. On the other hand, it also follows that if some necessary constituent parts are missing or compromised we could expect impairment in the mind's ability to function. A mind virus would be defined as a group of memes that attaches to the self in such a way as to ensure its propagation with deleterious effects on its host. While we might imagine the possibility of a neutral mind virus, such a virus would be difficult to identify and is beyond the scope of this paper.

Our understanding of mind viruses needs to consider how mental and physical universes may be said to differ. For example, while genetic evolution is Darwinian, cultural evolution is Lamarckian,[1] involving the heritability of acquired characteristics (Dawkins, 1982; Gould, 1996). As Pinker (1997) noted: "A complex meme does not arise from the retention of copying errors. It arises because some person knuckles down, racks his brain, musters his ingenuity, and composes or writes or paints or invents something" (p. 209). Further, memes lack a molecular structure and cannot replicate in the manner of genes (Carroll, 2005; Distin, 2005). If the evolutionary mechanism between genetic and memetic evolution differ, we would expect that the entities that evolve in the two universes also differ in fundamental ways.

The ability to reason has become an essential part of our self-definition as a species; and that ability is tied to notions of individual volition. We would expect a viral infection affecting the mind would result in a reduced or appropriated capacity to engage that ability. If an existent mental structure is essential for conscious thought and that structure is a product of evolution, mental entities that would appropriate the resources of the individual likely co-evolved. Through this lens, the quality of reason or conscious thought associated with the modern self was an evolutionary development metaphorically not unlike an immune system. An effective mind virus would inhibit the capacity for reason in ways detrimental to its propagation while allowing that capacity to be used to ward off competitors.

With affective, connotative, and behavioral properties serving to bind memes into complex structures, the observation that memes frequently change during transmission (Boyd & Richardson, 2000; Distin, 2005) is explained. The memetic forces of attraction that give the modern self stability also predispose the individual to interpret new communication in ways that reinforce an existent worldview. The forces that promote memetic clustering in the modern self attract or repel memes outside of those clusters resulting in incremental and directional change to the memetic structure itself. Such change was observed with respect to a young Chinese woman who, on moving to Canada to attend university, converted to an authoritarian Christian religious sect that served as a replacement for the parental direction she had experienced in China (Robertson, 2010).

Incremental self-change was also tracked with respect to a young aboriginal man who assimilated memes associated with Amerindian and Asian spirituality (Robertson, 2014a).

Change consistent with an individual's self-direction need not imply a mind virus any more than the process of aging would imply a physical one. Since viral infections involve the appropriation of resources at a cost to the host, those mental changes that imply commensurable mutual benefit would not fit the analogy. Successful use of the viral analogy requires change to the self that is inconsistent with previous self-direction and is measurable. Consciously planned transitions, such as those developed in psychotherapy, fail to meet the viral analogy as such change is volitional.

The distinction between volitional and non-volitional change is not always clear. For example, in their study of the propagation of urban legends Heath, Bell, and Sternberg (2001) found that memes that elicited disgust were more likely to be passed on to others irrespective of their truth content, than memes eliciting little emotion. From the subjects' perspective they were choosing to share stories with a high emotional content. From the perspective of the meme, however, memetic clusters that carried the capacity to invoke an emotional response (in this case disgust) were more likely to be replicated than those that did not. Since it would be in the replicative interest of a mind virus to convince those infected that they are acting volitionally, self-reports of choice, particularly in the presence of strong emotion, are of limited value.

Not all unplanned transitional self-change fits the viral metaphor. Unplanned transitions in response to crisis, trauma, or sudden environmental change that tax the adaptive capacities of the individual would not be viewed as viral unless such transitions involved the opportunistic appropriation of mental and/or physical resources by otherwise unrelated clusters of memes. Transitions engineered through the manipulations of a malevolent human actor for personal benefit would not fit this definition of a mind virus because human agency is still involved albeit without the agency of the targeted individual.

If we invoke an "intentional stance" (Dennett, 1996), we can see that it would be in the interest of our posited mind virus to have the individuals serving as its vectors believe that they were acting volitionally. Therefore, the determination of a mind infection must be made by an outside observer. Further, since humans are capable of altruistic motivations the criteria that the individual is not acting in his or her own self-interest cannot be absolute. The virus analogy may be thought to apply to those memeplexi that commandeer the minds of people to become vectors for their subsequent propagation at some personal cost without objective evidence that the individual is acting altruistically.

In summation, it is possible to envision a mental universe in which some entities act like viruses on those mental representations that give us selfhood. Fortunately, the foregoing discussion has produced a number of heuristics to help guide us in this determination as to whether a mind-virus "infection" has occurred: (a) a mind virus will result in an observable change or transition in the individual's self-definition that is neither planned nor related to self-betterment as may be found in psychotherapy, nor the result of the conscious manipulation of the individual affected; (b) the change must involve a diminution or negation of the modern self or its component parts; (c) the change must involve an appropriation of the individual's resources that have the effect of spreading the meme cluster in question and this is not attributable to altruism; and (d) the change is likely marked by considerable and uncharacteristic emotional valence.

Manifestations of suicide as possible mind-virus activity

Although suicide presents as an ultimate act of self-negation, not all suicides can be seen as manifestations of mind-virus activity. For example, it is possible to envision someone killing themselves in an effort to save the lives of others. It is also possible to envision someone with a terminal and painful illness rationally making such a choice. Further, we do not need a mind virus to explain the actions of someone who kills themselves as a result of a mental illness. In this section, we look at examples of suicide and self-destructive terrorism as promising areas for mind-viral research outside of these limiting exceptions.

An examination of suicide contagion

Incidents of suicide increase the risk of further attempts resulting in the establishment of numerous peer, family, and community post-suicide prevention programs (Burns, Patton, & Burns, 2000; Cooper, Lezotte, Jacobellis, & DiGuiseppi, 2006; Hvid & Wang, 2009; Rodriguez, Caldera, Kullgren, & Renberg, 2006). In an examination of the effect of priming as a mechanism of contagion Marsden (2001) found that university students were more likely to interpret neutral events as indicative of suicide ideation following exposure to written depictions of suicide on the internet. A correlational study involving self-beliefs and measures of hopelessness, depression, and suicidal ideation (Cornette, Strauman, Abramson, & Busch, 2009) found that discrepancies between present and ideal future selves constituted a form of negative self-evaluation which, in turn, correlated with hopelessness and suicide ideation. A third study that also involved university students (de Man & Becerril Gutierrez, 2002) examined the relationship between suicidal ideation and (in)stability of self-esteem, while controlling for the possible effect of depression. For those with low self-esteem, stable self-esteem appeared to be a protective factor. A study of French men and women (Lauer, de Man, Marquez, & Ades, 2008) found that suicide attempts are more prevalent among suicidal individuals who believe their lives are controlled by chance and who rely less on problem-focused coping skills. Helplessness and hopelessness were found to have concurrent validity and were significantly correlated with suicidal ideation (Lester & Walker, 2007). The qualities of low self-esteem, hopelessness, external locus of control, and suicide ideation, sometimes coupled with anger have been predictive of suicide attempts (Eltz et al., 2007; Lauer et al., 2008; Lester & Walker, 2007; Robertson, 2011).

In summation, a contagion effect has been noted with respect to incidents of suicide manifesting as an observable change or transition in the individual's self-definition. This change often involves diminished self-esteem and individual volition. The individual's cognitive processes have, at least in part, been appropriated in rumination about suicide ideation and associated narratives. Such changes are frequently marked by emotional valence including depression and anger. It is possible to envision that some of the observed contagion flows from connotative, affective, and behavioral implications of memes associated with the deceased as understood in the minds of vulnerable individuals. Further research is indicated.

An examination of a suicide cult

The world "cult" here references modern usage implying a form of mind control. Sogyal Rinpoche (1993) described the learning experience of a disciple whose Buddhist Master began throwing insults in his direction. In humility, the disciple crawled on the ground but was met first with pebbles and then with rocks. He continued to crawl until he was within reach and was bludgeoned by the guru's fists. We are told that the disciple, on regaining consciousness, was closer to "enlightenment." Barker (1986) and Hall (1987) assumed that an analogous, and more extreme, deference to a religious authority figure constituted mind control and contributed to the "Jonestown" mass murder/suicide.

Jim Jones, an ordained minister of the Protestant sect Christian Church (Disciples) used faith healing, prophecy, and social action to develop a 4,000 strong congregation in the San Francisco area known as the "Peoples Temple." In 1978 he led nearly a thousand of his flock to Guyana to establish an agricultural commune. A U.S. congressman and three of his aides were murdered following their investigation of conditions at the camp and the defection of some of its members. Jones' subsequent directive to commit "revolutionary suicide" precipitated over 900 deaths among his followers (Hall, 1987).

If we assume that the Peoples Temple suddenly morphed into a cult just prior to the tragic event, then we have indulged in a tautology: the murder/suicide is taken as evidence of its status as a cult which is then used to explain the mass murder and suicide. As Barker (1986) points out, Peoples Temple was not mentioned in the anti-cult literature prior to the events described. The unrecognized cult thesis necessitates the assumption that Jones' work in favor of racial integration and his charitable work with San Francisco's homeless was part of an elaborate deception designed to entrap others. A postulate that Jones' internal psychology changed with the intervention of Congressman Ryan is not helpful because he was followed, cult-like, by most of his immediate followers to the end.

Henson (2002) posited capture bonding and attention-reward systems flowing from evolved human status needs as explanation as to why humans are susceptible to memes that do them and/or their potential for reproductive success damage. While cults are no doubt adept at isolating members from macro-societies leaving members with few alternatives for obtaining needed self-reinforcement, such evolutionary mechanisms by themselves cannot explain why people would volunteer to be so captured and socially isolated.

The mind-virus thesis avoids many of the rational pitfalls associated with the modern notion of cult. A virus would be expected to have an infectious stage wherein the effects of the contagion are asymptomatic. A mind virus would also have a differential impact on people dependent on how their selves are constructed. It might also have a latency stage awaiting the right environmental and social conditions to trigger phenotypic reactions. The mind-virus thesis would also imply that Jones himself was caught up in the memeplex as opposed to being a malevolent actor intent on causing evil. Since the mind virus, as hypothesized, is simply a memeplex that promotes malignant changes to the self, it should be possible to map those changes before the individual's behavior becomes destructive. As Dennett (1995) ominously observed, a suicide cult that results in the death of its members does not result in the death of the memeplex of the cult if the

murder/suicide has the effect of spreading the memes involved to other minds. Names like "Solar Temple" (66 murder/suicide victims), "Heaven's Gate" (39 suicides) and "The Movement for the Restoration of the Ten Commandments" (778 murder/suicide victims) testify to the replicated form, if not the Biblical content, of the Jonestown massacre.

Terrorism and suicide bombings

If the 1993 deaths of 76 members of an offshoot of the Seventh Day Adventists called the Branch Davidians was the result of a fire set by members of that community, as was claimed by U.S. authorities laying siege, then the result was a murder/suicide similar to that which occurred in "Jonestown." Taking a different interpretation, Timothy McVeigh bombed a United States federal office building murdering 168 people in apparent retaliation. He expressed no remorse prior to his execution describing the children killed in the building's day care as "collateral damage," a phrase deliberately chosen to reference the U.S. invasion of Iraq. Although McVeigh did not take his own life, he had little rational hope of escaping.

We do not need to posit the existence of a mind virus to explain the actions of malevolent and ruthless individuals. Terrorism has been used by governments and their opponents to intimidate civilian populations into submission. For example, Chechen terrorists state their military objectives and even negotiate for their own safety in exchange for the release of hostages. But belief systems surrounding this activity can mutate.

The Russian government suggested that a January 2011 suicide bombing at a baggage section of the Domodedova International Airport appeared to be directed at international travelers who had no involvement in the Chechen conflict. Doku Umarove, the leader of the group who claimed responsibility, said that the U.S. and Russia, if they followed their own principles, would surrender world power to China. He also attacked the USA, Russia, Britain, and Israel for oppressing Muslims. We are left with the conclusion that the suicide bomber considered his own life to have less value than the opportunity for his leader to make a political statement.

In September 2001, 19 Muslim terrorists flew four passenger jets into targets in New York and Washington killing 2,996 people. The Islamist group Al Qaeda declared U.S. military involvement in the Middle East and the Israeli occupation of Palestine as its motives in organizing an attack that served no strategic military purpose. It was not a prelude to an invasion nor did it inhibit U.S. ability to carry out military operations elsewhere. But the jihadists were able to demonstrate an ability to deliver lethal damage similar in potential to that of technologically advanced cruise missiles with attending psychosocial impacts. The publicity surrounding this audacious and ruthless act served to inspire a class of Muslims to similarly donate their lives to this cause. Thus, the effective purpose of hitting the symbolic targets represented by the World Trade Center and the Pentagon was to aid in the manufacture of organic missile systems. The lives of the raw material used in this manufacture had no value outside of the cause for which they have been programmed by memeplexi spread virally. If the dehumanization implied in this manufacture involved a commitment to a religiously held belief, then we must examine the possibility that religion acts as a virus.

Viral implications of religiosity

Religion has been pictured as a mind virus that commandeers the resources of the individual to its replicative advantage (Brodie, 1996; Dennett, 1995). Dawkins (2006) observed, "As long as we accept the principle that religious faith must be respected simply because it is religious faith, it is hard to withhold respect from the faith of Osama bin Laden and the suicide bombers" (p. 306). Ray (2009) declared Roman Catholic priests to be human vectors who have been directed to spend all of their discretionary energies propagating a Catholic virus. He declared that their celibacy "is genetic suicide for the priest's genes, but gives the Catholic Church a powerful tool for propagation" (p. 28). Abadian (2006) described the post-American colonization religious narrative as a disempowering infection that includes, "the portrayal of humans as pitiful and degraded beings, an obsessive preoccupation with apocalyptic world endings … the glorification of suffering; the instilling of fear, shame, and unworthiness; and an insistence on the value of self-denial, total sacrifice, and punishment" (p. 23). This description of the Christianity given Amerindian peoples reminds us of Hoffer's (1951/1966) post-World War II description of ideological and religious mass movements:

> They … effect an enduring estrangement from the self. They depict an autonomous, self-sufficient existence not only as barren and meaningless but also as depraved and evil. Man on his own is a helpless, miserable and sinful creature. His only salvation is in rejecting his self and in finding new life in the bosom of a holy corporate body. (p. 80)

Hoffer was not speaking of all who share religious or ideological beliefs but to a subset of fanatics he termed "true believers." There is no existential necessity that a core belief in the historical existence of Christ (or Mohammed or Buddha) is necessarily tied to a doctrine that rejects one's own self and the selves of others. Not only is it possible to envision religious individuals who nurture others' and their own self-development, it is possible to develop an argument that religions in particular contexts have promoted such values (Campbell, 2004; Eungi Kim, 2004; Nishida, 1921/1990; Somerville, 2006). If we view our species' evolution as including social and emotional needs for identity, purpose, and transcendence, religion is not a virus per se but a social contract representing a balance between forces of collectivism and individualism. Group bonding, as may be effected by religious belief, could enhance group survival in contexts that demand individual sacrifice. Difficulties emerge with efforts to enforce millennia-old social contracts that evolved under different conditions. The virus, then, is not the old social contract but modern memeplexi that evolved from outdated religious doctrine.

At any given point in history evolutionary pressure may favor humanistic memes such as liberality and diversity, fundamentalist memes like essentialism and intolerance, or other directions and themes dependent on selection pressure with resultant changes to the corporate religious body. For example, Robertson (2007, 2014b) examined conditions favoring the selection of mutated religious memes disguised as spirituality in specific scientific and colonial contexts. The conditions under which subsets of religious memes may mutate into self-destroying mind viruses need study.

Discussion

"Meme theory" has been critiqued because memes have no molecular structure deemed necessary by some authors to ensure fidelity in replication (Burman, 2012); they are perceived to act more as elicitors than replicators (Atran, 2001); they are said to always be systematically transformed during transmission (Boyd & Richardson, 2000); and they are thought to normally change by directed mental processes as opposed to random mutation (Pinker, 1997). These concerns largely flow from the perception that the memetic perspective supports a thesis of environmental and cultural determinism. While this thesis was denied by Dawkins (1976, 1999), he failed to provide a mechanism that would allow for individual volition as is necessary in directed mental processing. It is proposed here that the culturally learned self is that mechanism, and that both the "viruses" and the hosts they may be said to "infect" are constituted by cultural units or memes. If the modern self constitutes the mental "body" necessary for reflective self-consciousness, then cultural units that impair that consciousness while appropriating the resources of the individual may be thought of as mental viruses. Since both the metaphoric mind viruses and the bodies upon which they act are cultural entities, we are able to contemplate evolved laws governing the mental universe at variance with those governing the biophysical realm.

We examined classes of suicidal behavior for evidence of mind-viral activity with the conclusion that some, but not all, meet the proposed criteria. It is likely that non-suicidal individuals may be infected by viruses with different phenotypic patterns, but there is a danger that the term could become a pejorative referencing people whose beliefs do not correspond with one's own. A blanket description of religion as a mind virus would fall under this caution. While elements of faith and obedience found within many religious belief systems may allow for viral mutations to escape rational examination, the social and economic conditions under which such transformations occur require further investigation. The mutation of ideological belief sans religion in directions satisfying the definition of mind virus also requires investigation.

There is no reason to suspect that the modern self stopped evolving with its first appearance with the implication that it has co-evolved with religion. Such a perspective invites further psycho-historical research. The relatively recent Euro-American emphasis on individualism as a positive attribute may be understood as a recent memetic mutation, but it is too early to say that it will become the planet-wide norm.

The paradigm developed in this paper places the self at the core of mind without which conscious reason would not be possible. We are both created by and create the configurations of memes around us. While our self is largely shaped by our place and time over which we have little control, it is also the mechanism by which we place ourselves in time and space perceiving, anticipating, and planning accordingly. To be meaningful, the concept "virus" applied to the mental universe must have the means to parasitically interact with this evolved process in a way that propagates the infective agent. Such an entity may accomplish this by inserting itself into the self of an individual. It is suggested that viral complexes of memes adapt, not primarily to the natural world, but to an environment bounded by culture in ways that are not necessarily adaptive for the individual host. The mechanisms by which such adaptations occur are, at this point, speculative and may differ

from those governing the genetic model. For example, as Gabora (2004) observed, memes might be viewed to be non-living phenomena with replicative properties like polymers preserving structure but failing to replicate with high fidelity.

In tracing the evolution of the meme "meme" from Dawkins' (1976) original conceptualization to Dennett's (1991) "thinkable psychological entity," to Blackmore's (1999) "reification of the term," Burman (2012) ties the evolution of the concept to the social, political, and economic events that popularized it. Such events as they influence the memes people choose, or think they choose, can be studied. From a meme's perspective change due to chance mutation or free will is indistinguishable, and this invites the possibility of designer viruses initially crafted as a means of manipulating human perceptions but taking on a life of independent replication.

As defined in this article, memes are a fundamental constituent of human cultures.[2] While most are useful, many offer no obvious advantage and some are demonstrably detrimental to the individual's survival and reproductive success. This paper has outlined a paradigm from which this phenomenon may be studied.

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Notes

1. During the 19th century, Jean Baptiste Lamarck proposed a model for evolutionary change in opposition to Charles Darwin's "natural selection." Lamarck's theory of acquired characteristics suggested that traits or skills developed by an organism during its lifetime could, to some degree, be passed on to its offspring. Thus, a horse-like animal stretching its neck to eat leaves in a tree would pass on a slightly longer neck to its offspring, with the result that in enough generations a giraffe species would evolve. This theory of evolution, as applied to the physical world, was discredited with Mendel's discovery of the gene. Dawkins (1982) anticipated Pinker's (1997) proposition that complex memes arise when someone "knuckles down, racks his brain, musters his ingenuity, and composes or writes or paints or invents something" (Pinker, 1997, p. 209) by suggesting that the cultural evolutionary process is Lamarckian. Note that some aspects of Lamarckism are also resurfacing with the study of epigenetics involving the study of environmental determinants of gene expression.
2. Dawkins' (1976) original definition of the meme as a replicable unit of culture would imply that there are also non-replicable units of culture. For example, as used in this paper, descriptive adjectives that lack connotative, affective, and behavioral dimensions would not be considered memes.

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Author biography

Lloyd Hawkeye Robertson is in private practice as a Psychologist and is on the Faculty of the Masters in Arts – Integrated Studies program, Athabasca University, Canada, where he teaches at the graduate level. His research has included a focus on the structure of the self, prior learning recognition, and aboriginal mental health.