Embodied Concepts and Mental Health

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Often drawing on the phenomenological tradition, a number of philosophers and cognitive scientists working in the field of “embodied cognition” subscribe to the general view that cognition is grounded in aspects of its sensorimotor embodiment and should be comprehended as the result of a dynamic interaction of nonneural and neural processes. After a brief introduction, the paper critically engages Lakoff and Johnson’s “conceptual metaphor theory” (CMT), and provides a review of recent empirical evidence that appears to support it. Subsequently, the paper underscores some of the limitations of CMT, points to some philosophical problems that require further attention, and explores possible implications for understanding and treating of mental disorders.

Keywords: conceptual metaphors, embodied cognition, Lakoff and Johnson, Merleau-Ponty

I. INTRODUCTION

The phenomenological tradition has in the past decades received renewed attention, particularly from psychologists, philosophers, and psychiatrists interested in certain developments and conceptual challenges in the cognitive sciences. In particular, a number of practitioners of cognitive science and philosophers of mind have used the resources of the phenomenological tradition to develop and situate their views in the expanding field of “embodied cognition” (EC). While it is safe to say that EC aims to provide an integrative framework for the emerging empirical work on embodiment in the cognitive sciences, it is also a nonhomogeneous research program that involves different theoretical commitments. Nonetheless, most proponents of EC think cognition is grounded in aspects of its sensorimotor embodiment and can be comprehended as the result of a dynamic interaction of bodily (non-neural)
and neural processes (Wilson, 2002; Shapiro, 2007, 2012a, 2012b; Foglia and Wilson, 2013). Also, most EC theorists would disagree with what Wheeler (2005, 84) calls “the principle of explanatory disembodiment,” which grants that some informational contents transmitted in bodily sensations are best specified in terms of bodily structures, but insists that comprehending the operating principles by which the mind processes this information does in no way require taking into consideration the characteristics of the individual’s physical embodiment. EC theorists also disagree with a persisting “old opposition between matter and mind” that is at least partly responsible for regarding cognition as pure problem solving, which, as Andy Clark puts it, “invites us to abstract away from the very body and the very world in which our brains evolved to guide us” (Clark, 1997, xii).

The influence of the phenomenological tradition on EC has undoubtedly been significant, but a lengthy mapping of the particular influences would lead us off topic (for a review, see Gallagher, 2014). In particular, EC authors have drawn on Merleau-Ponty’s work, acknowledging its merits in taking decisive steps toward rejecting the attempt to localize semantics in a symbolic realm functionally detached from sensorimotor systems, and toward understanding the mind as interwoven with body, world, and action. In order to give a very brief introduction to the field, and to place the work of George Lakoff and Mark Johnson within it, it is helpful to start by showing how prominent EC theorists develop impulses from Merleau-Ponty in different ways. After a brief outline of how the work of Lakoff and Johnson can be situated, I provide a critical introduction to Lakoff and Johnson’s “conceptual metaphor theory” (CMT) and review recent empirical evidence that appears to support it. In the last parts of the paper, I underscore some of the limitations of CMT and offer reflections on how CMT has implications for understanding aspects of mental disorders.

II. EC AND THE WORK OF LAKOFF AND JOHNSON

Francisco Varela, Evan Thompson, and Eleanor Rosch’s (1991) The Embodied Mind and George Lakoff and Mark Johnson’s (1999) Philosophy in the Flesh: The Embodied Mind and its Challenge to Western Thought contain two accounts that have since become influential for the field of EC. While both sets of authors acknowledge the work of Merleau-Ponty as a source of inspiration, and both use the example of color vision to argue in favor of an embodied account of cognition, they develop accounts of embodiment that exemplify strong and weak versions of the embodiment hypothesis.¹

Varela, Thompson, and Rosch (1991, xv, xx) explicitly acknowledge their work “as a modern continuation of a program of research founded over a generation ago by . . . Merleau-Ponty” and attempt to re-direct the focus of cognitive scientific investigation from representations to the sensorimotor
interactions between agent and world, conceiving of cognition as “embodied action.” They contend that cognition is the “history of structural coupling that brings forth a world” and that cognitive structures “emerge from the recurrent sensorimotor patterns” (Varela, Thompson, and Rosch, 1991, 173). Cognitive processes work “through a network consisting of multiple levels of interconnected, sensorimotor subnetworks,” while human embodiment, as a constraining factor on human cognition, reflects only one of many possible evolutionary pathways (Varela, Thompson, and Rosch, 1991, 213–214). Two basic tenets of their account of EC are that (1) “cognition depends upon the kinds of experience that come from having a body with various sensorimotor capacities” and (2) that “these individual sensorimotor capacities are themselves embedded in a more encompassing biological, psychological, and cultural context” (Varela, Thompson, and Rosch, 1991, 173).

Their view can be classified as committed to a strong version of the embodiment hypothesis, as they maintain that the explanation of everyday cognitive activity does not require positing mental representations. Quite simply, and radically, the claim is that standard representational and computational views of cognition are erroneous, and cognition is best understood in nonrepresentational and noncomputational terms. To support their thesis, they provide an analysis of color vision as a prime example of EC and a tight coupling between an agent and particular features of the environment. The particular relation giving rise to color vision stands in contrast to systems like digital computers, where the relation with the environment is specified through input/output relations (Varela, Thompson, and Rosch, 1991, 157). The point is that the tight coupling in human color vision remains unexplainable if one is committed to a traditional computational theory of mind.

In the work of Lakoff and Johnson (1999), we find a different interpretation of the work of Merleau-Ponty, as well as a different, weak version of the embodiment hypothesis that nevertheless views embodiment as a constraining factor on cognition. Lakoff and Johnson overtly identify the work of Merleau-Ponty as an important source of inspiration, noting that his work has in several ways anticipated their account of embodiment. The authors emphasize in particular Merleau-Ponty’s acknowledgement of the fact that “that our bodily experience is the primal basis for everything we can mean, think, know, and communicate” (Lakoff and Johnson, 1999, xi). Their main aim is to explicate abstract concepts and metaphors as grounded in particular domains of bodily experience and to elucidate how embodiment enables and constrains cognitive processes. Of course, given that CMT is considered as the most central idea in Lakoff and Johnson’s work, one might think that the ties to Merleau-Ponty are in fact quite weak: Merleau-Ponty does not explicitly discuss metaphors in his work (in fact he deals relatively little with language in general), and Lakoff and Johnson do not explain which parts of Merleau-Ponty’s oeuvre have served as a source of inspiration for their work. There are, however, some aspects that indicate
clear parallels, particularly in chapter six of *Phenomenology of Perception*, where Merleau-Ponty describes language as essentially an embodied activity, portrays words as the linguistic counterparts of bodily gestures, and refers to the body’s ability to convert “a certain motor essence into vocal form” (Merleau-Ponty, [1945] 2005, 211).

Lakoff and Johnson’s account resists the view that concepts are disembodied (in the sense of being modality-neutral) and that the sensorimotor system is modular, maintaining instead that the sensorimotor system structures and influences concepts and their semantic content. The problem is that traditional cognitive science tended to “analyze concepts on the basis of formal abstract models, totally unrelated to the life of the body, and of the brain regions governing the body’s functioning in the world” (Gallese and Lakoff, 2005, 455). On such a view, concepts are symbolic representations, reducible to symbolic computation. Instead, consistently with a weaker notion of embodiment, Lakoff and Johnson (1999, 20) think of an embodied concept as “a neural structure that is part of, or makes use of the sensorimotor system of our brains.” However, although the authors sometimes appear to be suggesting otherwise, their account represents a weak version of the embodiment hypothesis and is not irreconcilable with the computational theory of mind. First, one may grant that algorithms of a disembodied computational approach erroneously omit taking into account properties of the body, but insist that this does not exclude the possibility that a modified computational approach might successfully represent the appropriate bodily properties (Clark, 2008a; Shapiro, 2012a, 92–93). Second, when Lakoff and Johnson speak of configurations of neurons as performing “neural computations” that agents experience as forms of rational thought, one is under the impression that their account is at least compatible with a modified computational approach, which acknowledges that inferences are sometimes computed by the neural architecture utilized in perception and motor activity. Third, Lakoff and Johnson (1999) clearly maintain that the “cognitive unconscious” is representational and base their view to a significant degree on connectionist models of computation and mental representation processing.

To sum up, Varela, Thompson, and Rosch (1991), and Lakoff and Johnson (1999) take seriously a number of points made or at least hinted at by Merleau-Ponty, subscribing to Merleau-Ponty’s view that embodiment encompasses the body as an experiential structure, and the cognitive organization of human beings echoes their bodily immersion in the world. However, it is also apparent that Lakoff and Johnson subscribe to a weaker embodiment hypothesis than the one found in Varela, Thompson, and Rosch. Although they maintain that aspects of the world that our minds present to us are both shaped by our particular bodies and closely geared to particular sensorimotor capacities, their account does not require a wholesale rejection of notions like computation and representation.
In contrast to earlier theories about the nature of metaphors, Lakoff and Johnson (1980, 1999) propose that metaphors do not constitute merely a crucial aspect of language, but also an essential part of thought. The authors aim to offer linguistic evidence to support the view that we use “metaphors of thought” or “conceptual metaphors,” construed as systematic “mappings” (correspondences) between a concrete source domain (closely related to bodily experience), and an abstract target domain. Before we proceed, we should note that the talk of “conceptual metaphors” relies on a distinction between metaphorical versus nonmetaphorical domains. Importantly, the claim is not that all thinking is metaphorical: for instance, the sentence like “the balloon went up” involves the word “up,” but it is not metaphorical. As we shall see, metaphorical understanding characterizes talk of starting abstractions, higher-order cognitive states, emotions, etc.

The overall framework involves a number of arguments and hypotheses about semantics, language acquisition, and embodiment, but also sweeping claims about politics, science, and the Western philosophical tradition. In this context, I shall only deal with a part of their work containing a theory about the embodiment of certain basic concepts and metaphor-based cognitive processes, which, mostly for the sake of simplicity, will be referred to as CMT. I should add that the term “conceptual metaphor” is sometimes used ambiguously, referring both to the concrete use of expressions and to the implicit links between more abstract target domains and nonlinguistic source domains (Casasanto, 2014). Unfortunately, this further complicates matters. In this paper, the term will refer to the systematic “mapping” between source and target domains, acknowledging that conceptual metaphors can exist without corresponding linguistic metaphors.

It is helpful to start by exploring some of the details of the manner in which CMT explicates abstract concepts as grounded in particular domains of bodily experience. Lakoff and Johnson’s (1999) investigation of the role of the body in the formation of concepts is linked to their account of the role of metaphor for grasping and developing concepts. Some of the most basic orientational concept pairs like front versus back and up versus down are discernibly bodily based. Lakoff and Johnson (1999, 33–35) argue that we project this structure onto objects and understand the front of an artifact as the side we normally interact with and as the part of the artifact that “faces” the direction in which it normally moves. A being with a very different body, for instance one that has ten eyes that each face different directions, would have an entirely dissimilar conception of “back” and “front,” or might even lack such a conception. In the same way, other spatial orientational concept pairs (like up vs. down) develop because we have specific kinds of bodies.

Importantly, multiple domains map onto these basic spatial concepts and help structure less basic concepts. We talk about “being an upright citizen,”
describe feeling happiness as “being on top of things” and sadness as “feeling down,” and we conceive these emotions at least partly in terms of simple bodily orientations in space. When we talk about “being in a deep depression,” the relevant emotional state is conceptualized as a bounded region with a vertical dimension (“sad is down”). Such metaphors are constitutive of our understanding of emotions, and it is not difficult to see that the concept of sadness would be very different without the association to the vertical dimension. In the same way, the metaphor like “life is a journey” functions as a heuristic device that associates life with some kind of progress in space and enables thinking about events in our lives in terms of multiple idioms, giving rise to secondary metaphors (“I have lost my path” or “I’m at a crossroads”) that would be significantly different if we grasped life in terms of something else, like “solving a riddle.”

Complex conceptual metaphors like “life is a journey” can be broken down into arrangements of more basic metaphors, some of which are “primary” metaphors that arise from cross-domain mapping through regular correlations between embodied experiences. Developmentally, this occurs through a stage of “conflation” where young children fuse sensorimotor experiences with judgments, “conflating” intimacy and closeness, or affection and warmth, and developing the cross-domain associations. For instance, the metaphor “affection is warmth” arises because children experience the stable correlation of affection and warmth when their caretakers habitually embrace them. While at later stages the child learns to disconnect the domains, the cross-domain associations are maintained, leading to other metaphors like “a warm smile” or “a close friend” (Lakoff and Johnson, 1999, 50). Simultaneous with the experience of steady “associations” during the period of conflation, stable neural connections are generated that shape conceptual domains (Lakoff, 2014). As Lakoff (2008, 26) maintains, “via the Hebbian principle that Neurons that fire together wire together, neural mapping circuits linking the two domains will be learned. Those circuits constitute the metaphor.”

The idea of a stage of “conflation” originates in the work of Christopher Johnson (1999), who explicitly developed his account with Lakoff and Johnson’s work in mind. Although it has not been tested experimentally, and although aspects of Johnson’s theory of conflation (particularly those suggesting innateness) have been questioned, critics agree that the basic idea that children may acquire many metaphors when tracking stable patterns of correlation is appealing for several reasons (see Casasanto, 2013, 2014). In fact, as Casasanto (2014, 4) notes,

to the extent that these correlations in experience are universal (based on universal aspects of the body and the world) this proposal can potentially help to explain how some mental metaphors have become enshrined in so many of the world’s languages, without having to posit that the hundreds of ubiquitous mappings metaphor theorists have identified are all innate.
Importantly, neither Johnson’s theory of conflation nor Casasanto’s position exclude the possibility that at least some mappings may be innate. In fact, it appears that children demonstrate some space-time mappings prior to linguistic experience (Srinivasan and Carey, 2010; Lourenco and Longo, 2011).

Consistent with the main thrust of this picture, other researchers have suggested that basic concepts directly related to a child’s physical experience of the environment (weight, height, closeness, etc.) provide a “scaffold” for abstract concepts in a way that makes it possible for sensorimotor experiences to influence higher cognitive processes (Williams, Huang, and Bargh, 2009). Reflections on evolutionary processes appear to support this thesis, because the neural resources of our ancestors were primarily dedicated to sensorimotor processing, and because in the progress of evolution, simple structures often serve as the foundation for more abstract ones (Dawkins, 1976; Dennett, 1995; Wilson, 2002). So, just as certain biological adaptations build on previous adaptations, cognitive structures are also built on structures originally designed for other functions (Anderson, 2010). In this case, sensory-motor brain mechanisms serve new cognitive roles, while also retaining their original functions. This is supported by empirically informed theories of neural re-use, some of which directly deal with the sensorimotor grounding of concepts like the “neural exploitation hypothesis” (Gallese and Lakoff, 2005; Gallese, 2008) and the “shared circuits model” (Hurley, 2005; 2008).

IV. SOME EMPIRICAL SUPPORT

Consistent with their idea of an “empirically responsible philosophy,” which Lakoff and Johnson explicitly recognize in the work of Merleau-Ponty, they think that philosophical work should be informed by the best available empirical material, and, if applicable, generate empirically testable hypotheses. Indeed, recent behavioral and neuroscientific research exploring the connection through embodied metaphors between source domain and target domains (governing higher-order cognition, emotions, and behavior) appears to support CMT. The findings can to a certain extent address the concern that apart from evidence of the linguistic manifestations of embodied concepts and metaphors, support from nonlinguistic areas is needed to demonstrate their presence in cognition (Pinker, 2007; see also Gibbs, 2011).

Most of the relevant experiments deploy priming methodologies, often combining an investigation of effects that occur without the individual’s conscious awareness. Some studies expose participants to particular sensory experiences in order to activate concepts or goals, and explore bottom-up effects on higher-order judgments, emotions, behavior, and cognitive processing.
Others focus on top-down effects of the activation of certain concepts and metaphors on perception and bodily states. While in some cases the effects are unidirectional, demonstrating top-down or bottom-up effects, they are in most cases bidirectional (Casasanto and Boroditsky, 2008; Körner, Topolinski, and Strack, 2015, 3). The following sections offer a brief summary of some of the relevant research focusing on bidirectional effects related to (a) weight, surface, and smell, (b) physical temperature, and (c) cleanliness.5

Weight, Surface, and Smell

There is a clear metaphorical link between experiences of weight and concepts of seriousness and importance (“heavy responsibilities,” “matters that carry weight”), between experiences of texture and certain higher-order judgments (“smooth interaction,” “having a rough day”), as well as between tactile experiences of softness and hardness and higher-order judgments (“he is too soft,” “she is hard-hearted”). Consistent with the “heavy is important” logic, experiences of weight (holding a heavy or light clipboard) exert influence on participants’ judgments about importance (Jostmann, Lakens, and Schubert, 2009) and on their evaluation of job applicants (Ackerman, Novera, and Bargh, 2010).6 In the same way, participants holding a book that they deemed important estimated it to be heavier (but not more expensive), showing that importance-related information about an object has an impact on judgments about its heaviness (Schneider et al., 2011). Additionally, there is also a strong link between sensations of weight and moral transgression, consistent with metaphors like “weighed down by guilt.” Participants recalling a memory of an immoral act reported higher subjective body weight as the control group. There were also top-down effects on judgments related to physical activity, as the relevant participants tend to overestimate the effort required to accomplish physical tasks (Day and Bobocel, 2013). Corresponding bottom-up effects were demonstrated in a study that showed participants carrying a heavy backpack reported feeling more guilt and were more likely to exhibit moral behavior in comparison to participants carrying a light backpack (Kouchaki, Gino, and Jami, 2014).

Tactile experiences of smoothness and roughness and the metaphorically associated concepts of difficulty and harshness exhibit bidirectional effects. Participants who had completed a puzzle with pieces with a rough sandpaper cover assessed an ambiguously valenced social interaction as harsher and more difficult than participants who had completed the same task with smooth pieces (Ackerman, Novera, and Bargh, 2010).7 Participants who had first held a hard block subsequently judged an employee’s personality in an ambiguous interaction to be more rigid or strict than participants who had held a soft blanket. In addition, participants primed by sitting on a hard chair rated an employee as less emotional and more stable than did participants in soft chairs and exhibited more “rigid” negotiation behavior (Ackerman, Novera, and Bargh, 2010).
Physical Temperature

We often characterize other persons, social relationships, and social interactions by using temperature concepts like “warmth” (referring to traits including friendliness and helpfulness) and “coldness” (referring to opposite traits), and quick “warm-cold” judgments ground rapid evaluations of the trustworthiness of others (Fiske, Cuddy, and Glick, 2007). However, there are some surprising bidirectional effects in empirical research. For instance, tactile experiences of physical warmth trigger the activation of the concept of interpersonal “warmth,” which then exerts an influence on judgments and behavior (Williams and Bargh, 2008). Participants holding a hot cup of coffee evaluated the target person as substantially “warmer” and exhibited a preference for prosocial behavior. On the other hand, consistent with coldness-related expressions (like “cold shoulder”) describing social rejection or exclusion, participants recollecting social exclusion estimated the temperature in the room lower than participants recollecting social inclusion, and had more desire for warm beverages and food than participants experiencing social inclusion (Zhong and Leonardelli, 2008; see also Ijzerman and Semin, 2010). In addition, experiencing social exclusion results in a decrease in skin temperature, while physical warmth (holding a cup of warm tea) helps alleviate the adverse feelings linked to social exclusion (Ijzerman et al., 2012).

Priming participants with concepts related to anger (being “hot-headed,” etc.) lead them to overestimate the actual room temperature (Wilkowski et al., 2009), whereas participants exposed to higher temperatures tended to ascribe impulsive crimes to the criminals, compared to participants exposed to low temperature (consistent with an assessment of them as more “hot-headed”). Moreover, the participants exposed to low temperatures were more likely to ascribe premeditated crimes as well as crimes resulting in more severe penalty (consistent with an assessment of them as more “cold-blooded” or “cold-hearted”) (Gockel, Kolb, and Werth, 2014).

Cleanliness

Habitually used metaphors like “dirty hands,” “clean records,” and “clean conscience” indicate a strong association between moral and bodily purity. Consistent with what CMT would predict, recalling a memory of unethical behavior (or reading a story about it) augments the accessibility of concepts related to cleansing, and the menace to moral purity generates in participants a desire for physical cleansing (Zhong and Liljenquist, 2006). This effect has a bottom-up counterpart: participants who physically cleansed after recalling an unethical act reported reduced moral emotions, and their direct compensatory behavior for unethical acts significantly dropped, indicating that physical cleansing can actually “wash away” moral wrongdoings. The sense of cleanliness affects and improves one’s moral self-assessment, which, in turn, results in stricter judgments on matters that have potential
moral implications (Schnall, Benton, and Harvey, 2008; Zhong, Strejcek, and Sivanathan, 2010). In addition, the sense of cleanliness also appears to affect behavior: individuals make larger donations to charities prior to, rather than after, bathing for religious purification (Lobel et al., 2014).10

There are also noteworthy bidirectional effects related to the typical metaphorical expression of social suspicion that something “smells fishy.” Exposure to fishy smells motivated suspicion in participants, undermining their willingness to engage in cooperation, to trust others, and to act pro-socially. Correspondingly, top-down induced suspicion was demonstrated to cause metaphor-specific effects, increasing participants’ accuracy in labeling fishy smells (Lee and Schwarz, 2012).11

V. THE LIMITATIONS OF CMT

Overall, the material reviewed in the previous sections show that much higher-order cognition is grounded in the bodily experience of one’s environment so that bodily and abstract domains are intertwined via conceptual metaphors giving rise to bidirectional effects: sensory experiences have significant bottom-up effects on higher-order judgments and behavior, and the activation of certain concepts has top-down effects on bodily (perceptual) states. However, while the studies offer support for CMT, a couple of potential concerns need to be addressed prior to proceeding.12

Much criticism of CMT targets the sometimes “revolutionary” gesture of Lakoff and Johnson’s work, and in particular their fair-reaching claims about social, ethical, political, and meta-philosophical implications. The authors make a bold and far-reaching claim about the Western philosophical tradition, claiming that the history of philosophy has misconceived the nature of metaphors, resulting in the emergence of a flawed metaphysical tradition. This claim is problematic, and it radically rethinks the history of philosophical, legal, and political thought in terms of a succession of battles between rival frames rather than truth-evaluable propositions. Some have claimed that this amounts to a staunch relativism according to which metaphor-based frames trump facts (Pinker, 2007; for a review see Gibbs, 2011). However, my aim in this paper to explore CMT (and emerging empirical work that appears to support it) does in no way require accepting these claims. It should be emphasized that it is possible to side with CMT and acknowledge the function of metaphor in thought and language, while not accepting the very ambitious claim that (a) CMT challenges the validity of much traditional Western philosophical thinking, or (b) that agents are enchained by metaphors implicit in their languages, unable to transcend them (for this criticism, see Pinker, 2007, 248).

While introducing a more general limitation helps address a large part of the objections against the CMT, I suggest introducing two additional
modifications to make the CMT more robust and coherent. The first point is about concept acquisition, and concerns the relationship between the way human bodies are constituted and the kinds of concepts with which human beings operate. In a nutshell, the fact that the particular structures of the human body enable the acquisition of a distinctive range of basic concepts does not necessarily support Lakoff and Johnson’s (1999) slightly stronger thesis that, lacking human (or at least very human-like) bodies, organisms would not be capable of acquiring the kind of basic concepts with which human beings operate. It is difficult to exclude the possibility that analogous concepts could be developed through different processes.

The second point is about realization, related to the metaphysical identity-claim in CMT that “conceptual metaphors are asymmetrical physical circuits in the brain” (Lakoff, 2014, 7). In light of the relatively obvious philosophical weaknesses of the identity-claim, it is helpful to understand this claim in a more relaxed manner, namely, as the metaphysical claim that metaphors are realized in neural circuits that link a source region to a target region in a way that gives rise to uni- or bi-directional cross-domain effects. Having considered the empirical material, we are in a position to ask to what extent the findings are consistent with or provide support for the claim that metaphors are realized in neural circuits. The issue is multifaceted, and attempting to provide a comprehensive discussion would take us off our topic. Rather, what is pertinent for the goals of this paper is to ask whether the realization is exclusively neural. In other words, are the vehicles of realization exclusively neural, or could they include parts of the body or even the environment? Answering this question also helps to situate the CMT compared to Varela, Thompson, and Rosch (and other proponents of the enactive view such as Gallagher and Varela, 2003; Thompson, 2007; Chemero, 2009; Hutto and Myin, 2013; Gallagher, 2017) and to Clark (and proponents of an extended functionalism such as Clark, 1997; Clark and Chalmers, 1998; Wheeler, 2005; Clark, 2008a, 2008b). The short answer is that the studies cited in support of CMT do not suggest that conceptual metaphors are exclusively or necessarily realized in brain circuits, and do not indicate that they could not at least partially be realized in parts of the body or the environment. While the studies do offer support for CMT, they do not count as evidence against enactivist and extended accounts.

VI. CMT AND MENTAL HEALTH

As noted in the introduction, the burgeoning field of EC is nonhomogeneous, operating with different research foci, methodological and theoretical commitments, and even different conceptions of embodiment. Although in some ways the field is still in its nascent stages, with a number of unanswered questions paving the way for future research, we are beginning
to see some promising health care–related applications. Some researchers are beginning to make ideas from EC fruitful in a range of contexts exploring aspects of mental disorders (MacLachlan, 2004; Matthews, 2004, 2007; Stanghellini, 2004; Fuchs, 2005; Gallagher, 2005; Ratcliffe, 2008; Fuchs and Schlimme, 2009; Röhrich et al., 2014; Varga, 2014; Gallagher and Varga, 2015). It is proposed here that CMT, in the modified version, could make a valuable contribution to this literature.

For instance, some researchers see CMT as assisting in bridging the gap between psychological and medical research traditions with potentially wide-ranging advancement in the field of health psychology. Taking seriously that the concept of “health” acquires conceptual coherence due to its being mapped onto the vertical dimension of space (Crawford, 2009), recent work explores CMT as a means to help ensure positive development in health care contexts and to contribute to promoting prophylactic behavior (including adherence to treatment) and physician/patient communication (Sherman, Gangi, and White, 2010; Gangi, Sherman, and White, 2011; Ghane and Sweeny, 2013). A recent study found that, consistent with CMT, the concept of “healing,” when referring to both physical and psychological conditions, is metaphorically linked with an “up” bodily posture. This link is such that compared to priming of looking downward, priming looking upward promotes quicker decision-making related to the concept “healing” (Leitan, Williams, and Murray, 2015). The potential practical implications for mental health would of course have to be carefully studied, but one might speculate that enhanced thoughts about health could improve perceived mental health, which, in turn, might have psychological and behavioral effects that would contribute to recovery. Of course, it should be noted that “heal” might be linked to “up” more or less directly, and might be linked to the “up” bodily posture due to its distinctive positive valence (“good is up”). Also, it is at least not immediately evident that the potentially indirect nature of the link would significantly detract from its significance for health care–related interventions.

More concrete indications that CMT might be fruitfully deployed to mental disorders come from studies on emotional and bodily experience in depression. On the face of it, given its affective, bodily, and cognitive profile, the study of depression in light of CMT appears promising for several reasons. First, individuals affected by the condition often maintain that their experience of depression is nearly incommunicable, and metaphor provides the primary tool for articulating the illness experience. Originating in the Latin *deprimere* (“to press down”), the most frequent metaphoric constructs for conveying the experience of depression are “being down” and “descent” (McMullen and Conway, 2002; see also Kövecses, 2005), giving rise to metaphorical entailments that enable depressed patients to make coherent the experience of motor retardation. Second, when patients describe how their bodies become slow and heavy (“pressed or weighed
down”) passively at the grace of physical forces like gravity, they are describing a widely recognized aspect of major depressive disorder: that of reduced speed (of hand, legs, torso, and head movements), reduced vertical movements of the upper body, decreased arm swing, slumped posture, and specific alterations in gait patterns (Sloman et al., 1982, 1987; Parker and Hadzi-Pavlovic, 1996; Sobin, Mayer, and Endicott, 1998; Lemke et al., 2000; Michalak et al., 2009; for a review, see Buyukdura, McClintock, and Croarkin, 2011).

While the correlation of this cluster of posture-related traits and depressive symptoms like low mood is well established, with CMT we might predict that there are unidirectional or bidirectional effects between sensory motor and higher-order domains that might be exploited for therapeutic measures. While relevant research on the effects of depression on the motor system is largely lacking, two recent studies seem to indicate that modifications of gait and posture are able to affect cognitive processes, both dealing with the processing of self-referent information that is negatively biased in depression (Matt, Vázquez, and Campbell, 1992; Mathews and MacLeod, 2005). One of these studies manipulated gait patterns in a nonclinical sample. Participants, who had no knowledge about the intention of the experiment, were given computer-based feedback to change their gait patterns and to mimic characteristically depressed or happy walking behavior. The authors investigated their processing of self-referent material by measuring how many positive and negative words participants were able to recall from a list (Michalak, Rohde, and Troje, 2015). In the depressed gait condition, participants recalled more negative information related to themselves, leading the authors to conclude that “biased memory towards self-referent negative material can be changed by manipulating the style of walking” (Michalak, Rohde, and Troje, 2015, 124). One might be inclined to think that the effect is indirect, in the sense that the changed walking pattern induces an emotional change, which subsequently affects the processing of self-relevant material. Although the authors found no indication for affective changes, ruling out this possibility would require a more focused investigation.

While these findings indicate that relatively brief gait changes affect subtle cognitive processes related to memory, another recent study demonstrates that posture affects memory bias in a way that the CMT would predict. The participants, psychiatric inpatients with depression who scored 14 or more on the Beck Depression Inventory-II, were asked to sit in an upright (nondepressed) or slumped (depressed) posture. In order to investigate the effects of the postures on the cognitive processing of self-related information, positive- and depression-related words were presented one by one to the participants. After completing a subsequent distractor task, they were requested to recall the words that were presented to them in the course of the imagination task. In comparison with upright-sitting participants, participants in a slumped posture recalled less positive and more negative words.
Also, participants in an upright posture exhibited a balanced recall, recalling fewer negative words and more positive words (Michalak, Mischnat, and Teismann, 2014).

These studies indicate that motor retardation involving characteristic changes in posture and gait patterns are far from being merely reducible to bodily symptoms that accompany depression. Instead, they are intrinsically connected to biased cognitive and affective patterns and are constitutive parts of depression itself. Before offering some reflections on possible practical implications, it needs to be emphasized that more evidence is needed before substantial conclusions can be reached. Future studies would benefit from operating with a larger sample size and from further investigating details of the relevant effects by including nondepressed control groups, as well as a condition in which the bodily motor system is not manipulated. Also, the findings could be further strengthened if future studies could provide evidence for top-down effects.

If future research is able to provide more evidence for robust unidirectional and bidirectional effects, then we may begin to regard the motoric system as a promising locus of therapeutic interventions, expanding the range of therapies offered to patients. One might speculate that if patients with depression are successfully trained to transform dysfunctional motoric patterns, this might have lasting effects on some of the most central cognitive and emotional processing biases. Such interventions would be ideal for diverse populations of patients and would particularly benefit those who are not proficient speakers, or who, due to personality or cultural barriers, have a difficult time conveying their experiences. However, the success of such interventions will to a decisive degree depend on a number of factors that are probably best explored in longitudinal studies. Most importantly, it is quite apparent that the success will depend on the extent to which changes in patterned motor activity have an enduring impact on these biases, or whether they may diminish or even disappear after a certain period of time.

VII. CONCLUSION

The phenomenological tradition has been an important source of inspiration for a number of philosophers, cognitive scientists, psychiatrists, and psychologists in the flourishing field of “embodied cognition,” who subscribe to the general view that cognition is grounded in aspects of its sensorimotor embodiment and should be comprehended as the result of a dynamic interaction of nonneural and neural processes. The paper engaged Lakoff and Johnson’s CMT and provided a review of recent empirical evidence that appears to support it. Subsequently, the paper highlighted some of the limitations of their account, pointed to some philosophical problems that require further attention, and turned to possible implications for understanding
aspects of mental disorders. It was maintained that while some recent studies working with CMT show interesting and promising implications for the comprehension and treatment of depression, there are a number of unanswered questions that future research needs to address.

NOTES

1. Perhaps to a lesser extent, Andy Clark draws on ideas from the phenomenological tradition. Although the phenomenological idea that skilled practical engagement with the world is crucial for cognitive activity to a certain extent informs Clark’s critique of the idea that he refers to as “action-neutral kinds of internal representation,” Clark (1997, 148) rejects the strong version of the embodiment hypothesis found in Valera, Thompson, and Rosch (1991), according to which cognition is best understood in nonrepresentational and noncomputational terms. The reason for this is Clark’s conviction that the new data and conclusions about the tight coupling with the environment can be incorporated into an adequately modified computational framework (Clark 2014, Chapter 7).

2. We may also add that Lakoff and Johnson’s (1999) position is compatible with the idea of “circular causation” that Varela, Thompson, and Rosch (1991, 172–79) and Clark (1997) explicitly endorse. Also, while Varela, Thompson, and Rosch (1991, 9) resolutely oppose the idea that cognition is essentially the manipulation of representations, Clark remains sympathetic to the idea of internal representations, but he aspires to rethink their formats and contents.

3. More recent radical enactivist views that insist on a strong embodiment thesis often point out that this position does not necessitate claiming that mentality is never mediated by mental representations (see Thompson, 2007; Chemero, 2009; Hutto and Myin, 2013).

4. Expressions like “prices rose” or “prices fell” reveal how quantity judgments are conceptualized in terms of the sensorimotor experience of verticality (“more is up,” “less is down”).

5. For a less detailed presentation of studies exploring the consequences for moral reasoning, see Varga (2017) and Varga (forthcoming).

6. A study exploring the impact of weight sensations found that cognitive performance was significantly reduced when participants were asked to hold a heavy clipboard compared to a light one (Kaspar and Vennekötter, 2015).

7. This is supported by an fMRI study demonstrating that higher-order processing of metaphors related to the domain of texture recruits domain-specific sensory cortex activity (Lacey, Stilla, and Sathian, 2012).

8. The tactile experience did not influence judgments about traits unconnected to the warm–cold dimension.

9. The connection between physical and social coldness and warmth might have an anatomical basis: the insular cortex processes both social information about personal “warmth” and physical temperature (Meyer-Lindenberg, 2008; see also Kang et al., 2011 for an fMRI study).

10. A recent fMRI study supports the idea of the sensorimotor grounding of reflection on unethical behavior (Denke et al., 2014). Moreover, physical contamination and moral transgression activate the same facial muscles and corresponding neural networks (Borg, Lieberman, Kiehl, 2008; Chapman et al., 2009; Cannon, Schnall, and White, 2010; Lee et al., 2015).

11. It should be added that some of the specific details of the link between bodily and moral purity are culture-specific (Lee et al., 2015). However, acknowledging this does not undermine CMT.

12. There are also methodological objections against studies using priming methodology, but, on the whole, priming appears to be a valid tool to investigate the relevant aspects of implicit cognition (see Varga, 2017).

13. It should be noted that, also in this field, researchers tend to operate with different conceptions of “embodiment.”

14. For instance, being psychologically healed is sometimes expressed as being able to get “up and about.”

15. Although the metaphors “being down” and “descent” constituted the overwhelmingly majority (90%), other conceptual metaphors include “depression is darkness,” “depression is captor,” and “depression is weight.” The latter might, however, be understood as descending from “being down.”
16. Moreover, the course of depression symptoms may be predicted by focusing on biased memory (Beeney and Arnett, 2008).

REFERENCES


