Michael Polanyi and the Ecological Turn: Embodiment, Personhood, and Interdisciplinarity

Andrew Grosso

Key words: embodied cognition, personhood, interdisciplinarity, Michael Polanyi

ABSTRACT

Recent studies dedicated to exploring the relationship between cognition and the body have both yielded a rich variety of intriguing possibilities and introduced new questions and problems. Michael Polanyi's personalistic philosophy, enriched by insights from these studies, provides us with a means of addressing these challenges. In particular, Polanyi's account of the relationship between embodiment and personhood offers an expansive and integrative approach to the issues at the heart of this line of inquiry and thus provides a way of advancing these studies and bringing their insights to bear on other areas of analysis and reflection.

Introduction

One of the more interesting and potentially far-reaching lines of inquiry (both scientific and philosophical) in the study of the mind to have come into its own over the past several years involves analysis of the relationship between cognition and the body. Studies in "embodied," "embedded," and/or "extended" thought have raised a number of intriguing questions having to do not only with cognition but also with awareness, perception, action, and articulation. The various perspectives afforded by these studies, however, have also heightened certain familiar tensions (e.g., the question of how to correlate findings from disciplines as disparate as sociobiology, neuroscience, linguistics, and philosophy), and a heuristic framework capable of coordinating the research programs that define this field has not yet emerged.

The two principal sources that inform the argument of this essay include recent studies in embodied cognition and the personalistic philosophy of Michael Polanyi. I begin by expositing several distinct but related problems associated with the challenge of interdisciplinarity, a necessary first step in any attempt to coordinate findings from a range of disciplines. Next, I summarize Lawrence Shapiro's survey of various recent studies aimed at elucidating the extent to which the experience of embodiment conditions our apprehension, cognition, and articulation; I also provide a sketch of the wider intellectual milieu within which these studies should be situated. I then identify a number of themes in Polanyi's thought that both demonstrate Polanyi's contribution to our understanding of the nature of embodiment and its role in our experience as well as open up a particular approach to the challenges associated with interdisciplinarity. The final section describes this approach in greater detail, and proposes a way of addressing three distinct but related problems arising from attempts to coordinate different fields of inquiry. My overall argument is that a Polanyian reading of recent studies in embodied cognition helps us address the challenge of interdisciplinarity by situating embodied accounts of knowing within the wider, more integrative framework of personhood.

The Challenge of Interdisciplinarity

It has been more than one hundred years since Halford John Mackinder observed that the "bounds of all the sciences must naturally be compromises. Knowledge," he insisted, "is one. Its division into subjects is a concession to human weakness" (Mackinder 1887, 154). Despite Mac-

kinder's helpful reminder, the relationship between distinct areas of formal inquiry continues to be a problem; indeed, it has become *more* of a problem today than it was in Mackinder's time.

We encounter this problem in a variety of ways, many if not all of which involve a sense that there is an apparently irreconcilable tension in our knowledge. Examples of this tension include the "daisy of dichotomies" recently enumerated by Esther Meek, such as objectivity and subjectivity, facts and values, reason and faith, theory and practice, freedom and authority, public and private, the personal and the impersonal, etc. (Meek 2011, 8-12). Similarly, Mark Johnson has noted the division of the conceptual from the perceptual, the rational from the imaginative, the cognitive from the emotional, and the *a priori* from the *a posteriori* (Johnson 1987, xxxv-xxxvi). The fragmentation of our knowledge has led to the fragmentation of our lives.

Such dichotomies, however, are not themselves the heart of the problem: they are instead symptomatic of a number of deeper and more fundamental issues that can themselves be characterized in a variety of ways. Meek includes the modern longing for indubitability, the preponderance of ocular metaphors for all forms of knowing and understanding, and the "substantivalist" tendency to identify things more or less exclusively in terms of that which individuates them as opposed to that which they share with other things (Meek 2011, 20-30). Johnson traces the origins of the problem to the modern bifurcation of "the bodily and the rational" first promulgated by Descartes, elaborated by Kant, and perfected by Frege (Johnson 1987, xx-vi-xxxi). Similarly, Warren Frisina bemoans our dependence on "representational" accounts of language and knowledge and also faults our unwillingness to address "basic metaphysical questions" (Frisina 2002, 4-6).

Taken together, these factors present us with a range of distinct but related problems. For example, they make it difficult for us to account for the relationship between different domains of formal inquiry. We thus find it necessary to develop protocols for bringing different disciplines into "dialogue" with one another (e.g., by way of a presumably integrative rationality, method, language, or purpose). Oftentimes, however, such conversations result, not in the emergence of a more comprehensive and integrative horizon, but in a kind of perpetual negotiation between the disciplines in question (e.g., the on-going parley between the empirical sciences and theological studies).

Similarly, we find ourselves wrestling with the question of how the perspectives afforded by particular disciplines correspond with what we might call the "transcendentals" (by which I mean something closer to the classic, Aristotelian sense of this word rather than the modern, Kantian sense). We are, for example, increasingly inclined to recognize the extent to which beauty plays an essential role in all forms of knowing, or the extent to which our knowledge is shaped by moral commitments (cf. Rolnick 2007, 137-143). But our ability to account for the extent to which particular rationalities are grounded in a more fundamental experience of the true, the good, and the beautiful has not kept pace with the proliferation of more specialized (and thus circumscribed) forms of awareness (cf. Fernández-Armesto 1997, 9-45).

Finally, the increasing formalization and hyperspecialization of knowledge and its concomitant fragmentation have left us with an anemic understanding of the intellective enterprise and the role of thought in social, political, and cultural initiatives. This tendency is manifest in the presumed dichotomy between "theory" and "practice," but it goes deeper than that. At its heart, this tendency reflects a pervasive sense of anomie, a ubiquitous estrangement manifest in our sense of connection to the world, to one another, and even to ourselves. In the absence of any possibility of an expansive and coordinated account of the world, we find ourselves adrift in a sea of apparent meaninglessness, pulled inexorably towards both the Scylla of fatalism and the Charybdis of nihilism (cf. Meek 2011, 14-15, 22-24).

Thus, the challenge of interdisciplinarity involves more than simply "harmonizing" disparate fields of formal knowledge. The attempt to elucidate the connections between the various modes of appre-

hension and understanding whereby we strive to make sense of our experience and our world can be seen as nothing less than a comprehensive form of therapy (cf. Meek 2011, 3-6). The purpose of such efforts involves not only finding a remedy to the various philosophical or conceptual problems that beset us when we are confronted by an array of apparently unrelated "facts," but (more importantly) identifying ways of employing our intellective capacities in the articulation of a worldview that fosters human flourishing (cf. Meek 2011, 49-56). It is these concerns that are at the heart of this essay.

Recent Studies in Embodied Cognition

In his recent book *Embodied Cognition* (2011), Lawrence Shapiro provides a thorough and incisive comparative analysis of various approaches researchers and scholars tend to adopt in their efforts to make sense of the relationship between the body and the mind. Shapiro's reading of these studies is sympathetic but by no means uncritical; he offers a number of trenchant observations aimed at clarifying the merits of both (in particular) the insights and proposals of specific research programs and (in general) this wider development in cognitive studies.

Shapiro organizes his survey by way of three interpretive frameworks, each of which represents a distinct approach to the question of the relationship between the mind and the body. These frameworks include the "conceptualization hypothesis" (Shapiro 2011, 70-113), the "replacement hypothesis" (114-157), and the "constitution hypothesis" (158-200).

The first of these (conceptualization) is organized around the idea that the nature and shape of the concepts employed by the mind are grounded in and constrained by the experience of the body. The second (replacement) proceeds under the assumption some forms of cognition traditionally ascribed to the activities of the mind should rather be understood in terms of patterns of embodied action. The third (constitution) suggests our understanding of the mind should include not only the brain and its activities, but should also recognize those features or dimensions of the body (and, in some cases, even the environment) that participate in acts of cognition. Taken together, these three frameworks thus evince a kind of spectrum: forms of the constitution hypothesis try to make a stronger case for the correspondence between mind and body than do forms of the replacement hypothesis, which in turn try to make a stronger case than do forms of the conceptualization hypothesis.

The conceptualization hypothesis, Shapiro suggests, tries to carve out a middle ground between the "chicken" of realism and the "egg" of idealism (54). Representative examples of projects aimed at advancing some form of the conceptualization hypothesis include the account of embodied cognition advanced by Francisco Varela, Evan Thompson, and Eleanor Rosch (52-56, 83-86), the analysis of the influence of embodiment on semantics, conceptualization, and articulation provided by George Lakoff and Mark Johnson (86-95), and the "indexical hypothesis" of Arthur Glenberg (98-103). The thing that unites these various projects is their shared commitment to the idea that the body both grounds and constrains our behavior, our awareness, and our concepts; hence, different forms of embodiment generate different forms of action, perception, cognition, and articulation. Shapiro finds this to be a helpful reminder, but does not regard it as being quite as revolutionary as some of its proponents suggest. Traditional cognitive science, he argues, is quite capable of accommodating many of the insights afforded by the conceptualization hypothesis (91-95, 104-106, 112-113, 202-206).

Because it goes one step further than the conceptualization hypothesis, the replacement hypothesis offers a more radical critique of traditional accounts of the mind; indeed, this perspective is the one "most self-consciously opposed to the computational framework at the core of standard cognitive science" (114). Representative examples of projects that advance some form of the replacement hypothesis

include Timothy van Gelder's "dynamical hypothesis" (118-119, 144-149), Randy Beer's analysis of "categorical perception" (127-133), and Rodney Brooks's work in artificial intelligence and robotics (137-141). Those dedicated to the replacement hypothesis tend to share a commitment to the significance of dynamical systems theory; complexity, emergence, and coupling all play important roles in helping to describe the interdependence of the brain, the body, and the environment in acts of perception and cognition (56-61, 116-118). As with the conceptualization hypothesis, however, Shapiro finds the replacement hypothesis a bit lacking. In particular, he highlights the distinction between "description" and "explanation" as a way of probing the potential shortcomings of accounts of cognition that employ dynamical systems theory (133-137). He also recognizes the difficulties associated with attempts to clarify what does and does not count as a representation; these difficulties blunt the critique that replacement hypothesis theorists tend to level against traditional cognitive science (141-155). In the end, he suggests, replacement theory falls short of fulfilling its own ambitions, and although it may be a useful way of exploring *some* forms of cognition it is unlikely it can account for *all* of them (156-157, 206-208).

In some respects, the constitution hypothesis is more radical and potentially far-reaching than either the conceptualization hypothesis or the replacement hypothesis; at the same time, the constitution hypothesis is not necessarily as inimical to traditional cognitive science as the other two tend to be (159). By proffering a more expansive definition of the mind, the constitution hypothesis widens the boundaries of cognitive science without necessarily rejecting the expectations of a more computational or representational framework. Examples of projects aimed at advancing some version of this hypothesis include the sensorimotor theory of perception developed by Kevin O'Regan and Alva Nöe (164-170), the well-known elaboration of "extended cognition" championed by Andy Clark and David Chalmers (175-178, 182-191, 195-197), and Rob Wilson's description of "wide computationalism" (191-193). This approach, of course, is not without its detractors, and Shapiro gives equal time to the criticisms raised by Fred Adams and Ken Aizawa having to do with the failure on the part of constitution hypothesis theorists to distinguish between causality and constitution (161-163, 184-193). In the end, though, Shapiro seems to find the constitution hypothesis potentially the most fruitful of the three, not least because it does not necessarily compete with traditional cognitive science so much as it invites a reconsideration of the parameters of the discipline. The one caveat he offers is that the constitution hypothesis raises "vexing questions about personal identity and the nature of the self" (199; Shapiro quotes here from Andy Clark's *Supersizing the Mind* [2008]) and thus may harbor unacceptable "metaphysical consequences" for our understanding of persons (210).

Shapiro's analysis of these frameworks helps foreground the issues at the heart of this essay. He acknowledges that the conceptualization hypothesis, the replacement hypothesis, and the constitution hypothesis all may very well have something to say about the mind and its activities, but he also identifies various reasons for concluding that none of them are likely to supplant traditional cognitive science entirely (i.e., none of them will likely ever be able to account for the full range of human knowing). Thus, we find ourselves faced with the challenge of identifying a unified heuristic framework capable of accommodating both the insights of the studies Shapiro reviews as well as other forms of apprehension, understanding, and articulation that may not admit as readily to the kind of analysis made possible by these three hypotheses.

Obviously, each of these three frameworks also engages a considerable range of questions and problems (albeit at times only implicitly): not only is each concerned with better understanding cognition, each also finds it necessary to consider the nature of intention, action, perception, conception, and articulation. Each framework is also (to varying degrees) concerned with the development of an ontology capable of supporting their respective accounts of the act of knowing. Thus, each framework finds itself to some degree or another (and consciously or otherwise) necessarily dealing with questions of an interdisciplinary nature. How, for example, does research in the empirical sciences (e.g., neuroscience) and information sciences (e.g., robotics) inform work in the human sciences (e.g., psychology), and how do

these each in turn inform more philosophical forms of inquiry? How, too, do the kinds of assumptions and expectations amenable only to philosophical analysis help guide and shape research programs?

Thus, the net effect of Shapiro's analysis is that recent studies in embodied cognition cannot yet be said to be a unified movement, let alone a "well-defined theory" (2). What we see here is perhaps the beginning of a new, unified perspective, but one that has yet to coalesce in a fully integrated or productive manner. It is not hard to intuit how Polanyi's thought might be especially useful at this point: not only does his account of knowing potentially help further elucidate each of the three frameworks outlined above, his wider philosophical vision also provides a means whereby the interdisciplinary issues that emerge from these studies can be addressed. In other words, Polanyi provides us with exactly the kind of expansive, integrative philosophical framework capable of (first) accommodating many of the proposals of recent studies in embodied cognition while also (second) avoiding some of the narrowness of particular frameworks or research programs.

Before turning to a more fulsome account of how exactly Polanyi's work enables us to do this, I will outline in a rather cursory manner a number of developments that have been unfolding in several areas of study related to those Shapiro explores. Doing so will not only help contextualize studies in embodied cognition but will also help further highlight the challenge of interdisciplinarity and the potential contribution Polanyi can make to this conversation.

The Ecological Turn

One of the things proponents of the conceptualization hypothesis, the replacement hypothesis, and the constitution hypothesis all share is a commitment to the reconfiguration (or even, in some cases, the overthrow) of traditional cognitive sciences. However, it seems recent studies in embodied cognition represent more than just a reaction to a (ostensibly) moribund discipline. They also testify to a broader trend in Western thought, one that has been percolating for many years and has now emerged across a range of disciplines. Taken together, these developments signify a shift towards a more relational or ecological approach to questions having to do with awareness, understanding, articulation, identity, and reality itself.

Attending to the place of the body in acts of knowing and understanding goes back at least to Merleau-Ponty's *Phenomenology of Perception* (1945), but Walter Cannon's earlier *The Wisdom of the Body* (1932) is perhaps also relevant here. Some of the later work of Michel Foucault (e.g., 1975's *Discipline and Punish*) likewise represents an effort to examine the ways embodiment determines experience, knowing, and identity. Similarly, Elaine Scarry's *The Body in Pain* (1985) attempts to come to grips with the kind of knowing and being that arises out of the experience of subjugation, negation, and suffering. More recently, Samuel Todes has in his *Body and World* (2001) clarified the relationship between the line of inquiry initiated by Merleau-Ponty and earlier philosophical developments as well as extended its trajectory. Each of these rather disparate studies witness to a broader trend, namely, an increasing regard for embodiment and the way its shapes our knowing and being.

We see further evidence of this ecological shift in contemporaneous accounts of conceptualization and articulation. Mark Johnson has argued one can find an awareness of the correspondence between embodiment and language as far back as Samuel Taylor Coleridge's account of metaphor (Johnson 1987, 68-69). Whether or not awareness of this correspondence dates back quite that far is in some ways a moot point given the more recent efforts of Ludwig Wittgenstein, J.L. Austin, Benjamin Whorf, and others like them, each of whom in different ways provide an analysis of conceptualization and articulation that contributed to the gradual but inexorable conclusion that our embodied practices contribute at a rather primordial level to our acts of understanding and communication. More recently, Mark Rowlands (1999, 2006) has pursued this line of thinking in ways that draw out and capitalize on this correspondence. This preoccupation with the way the ecology of meaning (semantics, conceptualization, articulation, etc.) shapes our knowing and being further testifies to a wider intellectual shift.

Also closely related to the concern for understanding embodiment is a concern for understanding intentionality. This issue itself has generated a range of studies, from (first) those dealing with preconscious or implicit intentionality to (second) those dealing with conscious or explicit intentionality to (third) those dealing with unconscious or sublimated intentionality (often confused with but actually quite different from preconscious intentionality). Warren Frisina (2002) has argued this concern for the primacy of intentionality is evident in both the pragmatism of John Dewey and the process thought of Alfred North Whitehead. James Gibson's exposition of the role of action in visual perception inaugurated a rethinking of the nature of perception more generally, and his *The Ecological Approach to Visual Perception* (1979) is an important resource for many working in the area of embodied cognition (cf. Shapiro 2011, 28-37). The work of Stephen Turner (1994, 2014) and Harry Collins (2010; Collins and Evans 2007; Collins and Kusch 1998) has likewise helped define the shape of this field. A recent collection of essays demonstrates just how important action theory has become to contemporary studies in perception, learning, cognition, developmental psychology, and sociology (see Prinz, Beisert, and Herwig 2013).

There is one final development that bears mention at this point, namely, what Philip Clayton and Paul Davies have described as the "re-emergence of emergence" (see Clayton and Davies 2006). Earlier I noted (following Shapiro) the extent to which replacement hypothesis theorists in particular often depend on some version of dynamic systems theory; it is, however, not only those working in the area of embodied cognition who employ such models. The study of complex, nonlinear, adaptive systems has influenced a wide range of fields, including cognition and the mind (cf. Clayton 2004). We now recognize the "conceptual framework" of dynamic systems theory "has significant implications for the philosophical concepts of identity, teleology, cause, and explanation" (Juarrero 2002, 123). This is further evidence of the influence of Whitehead on late modern thought, and one could easily argue this tendency is also rooted in modern evolutionary theory.

The attentive reader will have noticed the preceding summaries of studies in embodiment, articulation, intentionality, and dynamic systems roughly correspond to the three frameworks Shapiro explores. This correspondence is of course not accidental and is intended to suggest the conceptualization hypothesis (with its concern for understanding articulation), the replacement hypothesis (with its concern for demonstrating the importance of intentionality and action), and the constitution hypothesis (with its concern for elucidating the interdependence of distinct forms or levels of activity) together represent the flowering of a number of trends that have been unfolding for some time now, all of which depend on the attempt to advance our on-going exploration of the importance of embodiment. Taken together, these trends signify what I believe we can call an "ecological turn" in late modern thought.

This "turn" represents a third option to the regnant traditions of (on the one hand) postmodern deconstructionism and (on the other) reductionistic materialism. Over and against the former, the ecological perspective provides a more holistic account of understanding by affirming the unity-in-distinction between knowledge and experience and our capacity to speak meaningfully of both (Frisina 2002, 156-159). Similarly, the ecological perspective does not require adopting a "hermeneutics of suspicion" when it comes to the reality and perdurance of the self (cf. Rolnick 2007, 91-120). The ecological perspective also evades the pitfalls of materialist reductionism, avoiding as it does the inconsistency of attributing the emergence of purpose and meaning to deterministic and mechanistic impersonal processes (Frisina 2002, 55-67; cf. Rolnick 2007, 63-90) and the tendency to associate cognition with brain states (Frisina 2002, 49-50). Contrary to both deconstructionism and reductionistic materialism, the ecological perspective affirms the possibility (indeed, the necessity) of developing a metaphysical account of action, meaning, understanding, and reality (Frisina 2002, 67-70, 177-192; cf. Rolnick 2007, 189-256). As we shall see, the question of the nature and reality of personhood is one of the more significant issues at stake in ecological studies.

This admittedly perfunctory account of these trends and their correspondence is intended to do only two things: (first) to demonstrate in a very rough way how recent studies in embodied cognition fit within their

wider intellectual milieu and (second) to help highlight the considerable range of interdisciplinary questions associated with such efforts. Both of these points are in turn intended to do nothing more than further anticipate what follows, wherein I introduce some of the ways Polanyi's thought can be brought to bear both on the distinct perspectives afforded by the conceptualization, replacement, and constitution hypotheses as well as on the more general question of how the insights of these distinct perspectives might be coordinated and integrated.

Polanyi and the Ecological Turn

Embodiment, intentionality, cognition, articulation, emergence: all of these are of course themes to which Polanyi devoted considerable time and energy. What is especially noteworthy about his efforts is the way he managed to coordinate his insights about these themes within a unified framework, one ultimately beholden to the reality of persons. This both accounts for the fecundity of his thought and makes him an ideal conversation partner for those engaged in the study of embodied cognition. Before exploring some of the possible directions this conversation might take, I will examine how Polanyi approached the major themes introduced by the three frameworks outlined above. How does his thought line up with the proposals made by recent studies in embodied cognition and fit within the broader ecological turn such studies signify?

Polanyi's work, unlike those Shapiro examines, did not begin with an exposition of the body and its importance; nevertheless, the significance (indeed, centrality) of embodiment emerged as a consequence of his analysis of other themes. The "logical structure of personal knowledge" and its "dynamic sources" lie precisely in our awareness of our bodies and the interactions of our bodies with and in our environments (*PK*, 60). It is the "intelligent [i.e., purposeful] use" of our bodies that gives us the ability to extend our efforts at knowing and being by simultaneously incorporating or interiorizing elements (both physical or conceptual) of our environment into ourselves and thereby indwelling them (*TD*, 16). Indeed, higher forms of life in some ways represent nothing other than higher, more complex forms of embodiment, wherein each element relies increasingly on the others that support it and thereby contributes to a life organized around "comprehensive governing principles of universal standing" (*PK*, 323). Embodiment is the locus at which knowing and being converge, the pivot on which turn our most primordial and most sophisticated strivings.

Any mention of striving, either primitive or sophisticated, takes us immediately to a consideration of the nature of intentionality. We do ourselves no favors, Polanyi argued, by trying to pass off purposeful action in terms of mere heuristic efficiency or explanatory "simplicity" (cf. *PK*, 15-17). Our actions are grounded in a range of passions, both private and public (*PK*, 171-174), that structure our subjective, personal, and objective forms of knowing. Despite their humble (some might even say ignominious) beginnings in the satisfaction of purely subjective appetites, our passions are what enable us to strive for the more sophisticated, responsible forms of commitment that define us as persons and even for the highly abstract, almost entirely impersonal accomplishments of "completely formalized experience" and thought (*PK*, 300-303). Not only do our passions exercise a "selective" influence on the affordances we pursue, they exercise a "heuristic" influence in our efforts to clarify and expand the affordances available to us (*PK*, 134-145). Together these strivings bear witness to a "logic of achievement" that accounts not only for human knowing but for the whole panoply of life (*PK*, 327-405).

Polanyi's use of *Gestalt* theory also bears mention at this point: his account of the role *Gestalten* play in perception and conceptualization is directly related to his account of achievement and thereby indirectly related to his account of intentionality. The apprehension of *Gestalten* signifies "the outcome of an *active shaping of the experience performed in the pursuit of knowledge*" (*TD*, 6, emphasis added). Polanyi thus made a significant and innovative contribution to the *Gestalt* theory of his day and anticipated the emphasis on action evident in the three frameworks Shapiro identifies. The mind, he suggested, is not a passive receptacle awaiting sensory impressions from the world; rather,

the mind actively participates in the coalescence of meaningful patterns in the environment (whether that environment is physical, relational, or conceptual). This does not, however, result in an idealist epistemology: we entrust the "life and guidance of our thoughts to our conceptions" because we believe their "manifest rationality is due to their being *in contact with domains of reality*" and because we anticipate this correspondence will reveal an "indeterminate sequence of novel future occasions" whereby our understanding of reality will be further clarified and refined (*PK*, 104, emphasis added).

Each of these—embodiment, intentionality, apprehension—come together in Polanyi's analysis of the tacit dimension. Our more general and integrative but subsidiary awareness combines at all times with the more discriminatory and particular focal awareness we have of specific entities (*PK*, 55-56). Both subsidiary and focal awareness are decidedly functional: the former guides us out of ourselves towards an encounter with that which we apprehend by way of the latter, which in turn carries us even further beyond the encounter to the world (*TD*, 95-96). Likewise, the phenomenal, semantic, and ontological aspects of tacit knowing bear further evidence of the dynamic character of apprehension and cognition. The first has to do with our recognition that the meaningfulness of the elements of our subsidiary awareness lies in the relationships they share by virtue of their participation in the object of our focal awareness. The second has to do with the transposition or displacement of the meaning of these objects (both subsidiary and focal) away from ourselves. The third has to do with both our understanding of the comprehensive entity we thereby apprehend and our accreditation of the means whereby we apprehend that entity (*TD*, 10-13). Polanyi's exposition of tacit knowing clearly provides us with a dynamic account of the relationship between the knower and the known that avoids both the "chicken" of realism and the "egg" of idealism (Shapiro 2011, 54).

The expansive character of Polanyi's epistemology is perhaps nowhere more evident than in his account of language. Forms of expression are "conceptual frameworks" that afford distinct ways of understanding our experience and apprehending the world (*PK*, 104). Out of our inchoate experience emerge a variety of patterns of representation that bear witness to a complex range of meanings (and hence testify to a complex range of entities and degrees of reality). At a very general level, Polanyi distinguished between the "*ineffable domain*" (wherein the tacit predominates), the "intelligible" domain (wherein the tacit and the focal are coextensive), and the "*domain of sophistication*" (wherein the focal predominates); each of these is manifest in the patterns of conceptualization and articulation we associate with the "descriptive sciences," the "exact sciences," and the "deductive sciences" (*PK*, 82-95, emphases in the original). Similarly, Polanyi's later exposition of the differences between signs, symbols, metaphors, art, and myth attests to his determination not to allow different forms of meaning to be collapsed into one another (*M*, 66-148). It's also worth noting that Polanyi leveraged the correspondence between language and our knowledge of other minds: by dwelling in the forms of conceptualization and articulation of another, we recapitulate their experience in ourselves and thereby come to understand them (*M*, 48). Thus, Polanyi's understanding of the embodied, dynamic relationship between the knower and the known extends to his account of the relationships between persons. In other words, he provides us with an "ecological" account of interpersonal relations that is consistent with but that goes beyond the three frameworks outlined above.

Running like connecting threads through each of these themes (embodiment, intentionality, apprehension, cognition, articulation) are two additional concepts Polanyi employs: the first is emergence, and the second is personhood. Emergence is a recurring motif, one that shapes Polanyi's account of virtually every other theme he explores. The "operational principles" of complex, purposive entities exercise "marginal control" over the "boundary conditions" that delimit the nature of these entities (*TD*, 34-36, 40-45). Likewise, the distal elements of our focal awareness (i.e., those that testify to the operational principle of the objects of our awareness) supervene on the proximate elements of our subsidiary awareness in ways that enable us to recognize the former in and through the latter (*PK*, 59-61). Again, the significance of various forms of conceptualization and articulation harness the more rigid and narrow

laws that govern languages (e.g., poverty, grammar, iteration, and manageability) and thereby facilitates the communication of an almost unlimited range of meanings (*PK*, 77-82). Polanyi's understanding of emergence and its ubiquity led him to suggest we should understand all of life as a "cosmic field" wherein a countless range of "centres" of purposive action pursue "short-lived, limited, [and] hazardous" opportunities "for making some progress of their own towards an unthinkable consummation" (*PK*, 405).

In and of itself, however, emergence is not enough to account for knowing and being: it is only the concept of the person that ultimately enables us to make sense of the world and our experience therein. Joan Crewdson may have overstated the extent to which Polanyi's philosophy enables us to affirm some form of "mind" has been the "ordering principle … at work in the evolutionary process from the beginning" (Crewdson 1994, 19), but she was certainly right to say he understood the emergence and development of life as a series of "steps on the road to personhood" (Crewdson 1994, 206). I have elsewhere suggested Polanyi's account of the reality and nature of persons moves simultaneously in two directions, one "emergent" and the other "existential" (Grosso 2007, 64-71). Both have to do with the responsible pursuance of the affordances provided by the contingencies of human experience in ways aimed at achieving greater integrity, meaningfulness, and freedom. The former (emergent) has to do with the concrescence of the embodiment of a personal entity in response to "comprehensive governing principles of universal standing" (*PK*, 323). The latter (existential) has to do with the actualization of a vocation oriented towards the satisfaction of universal standards despite the "fiduciary hazard" involved in any such effort (*PK*, 213-214). Whether we're talking about knowing or being, the concept of the person lies at the heart of Polanyi's account of both (and thus at the heart of all his thought).

Embodiment, intentionality, cognition, articulation, emergence, personhood: for Polanyi, these were not only related but to no small degree interdependent. Polanyi recognized the correlation between knowing and being, between "understanding, believing, and belonging," early in his philosophical career (see Polanyi 1947), and this interdependence is yet another indicator of the ecological tenor of his efforts. Others have capitalized on this aspect of Polanyi's *oeuvre*: we hear clear echoes of this interdependence in William Poteat's (1981, 176) account of our "mindbodily being in the world" and in Charles Lowney's (2013, 20) use of the term "epistemontology" to describe the "interweaving of knowing and being." Polanyi thus enables us to recognize there is more than one ecology involved in perception, cognition, and articulation: we must account for both the range of informal ecologies manifest in (as) the relationship between the knower and the known as well as the series of more formal ecologies having to do with the dimensions of our awareness, cognition, and articulation (i.e., epistemology, phenomenology, axiology, and ontology). The reality that grounds, links, and animates each is that of the responsible person.

Interdisciplinarity: from Bodies to Persons and Back Again

Earlier in this essay I indicated one of my chief concerns would be to examine the question of interdisciplinarity and identify how a Polanyian account of embodied cognition can help us address this issue. I then identified some of the various ways the challenge of interdisciplinarity confronts us, outlined various recent efforts aimed at clarifying the relationship between embodiment and cognition and what these efforts suggest regarding the direction of late modern thought, and proposed various ways Polanyi's thought can further illumine the embodied character of all knowing. In this section, I demonstrate (albeit in a rather programmatic fashion) how the insights of the previous sections bear on one another.

First, to say explicitly what to this point has been mostly implied, Polanyi's thought accommodates (and, indeed, anticipates) all three of the frameworks Shapiro identifies; he is therefore an important conversation partner for those engaged in each of these research programs. This is so not least because his thought provides a way of accommodating the insights of each perspective while also facilitating the

correlation of all three. In short, Polanyi enables us to recognize the extent to which the conceptualization hypothesis, the replacement hypothesis, and the constitution hypothesis potentially *complement* one another and need not *compete* with one another. All of them offer valuable insights and productive lines of inquiry. None of them, however, is able to provide an exhaustive account of human knowing. Thus, they all require a wider, more comprehensive philosophical framework capable of accrediting their particular insights. Polanyi's analysis of embodied knowing provides precisely this kind of framework.

Second, Polanyi's philosophical framework does more than simply provide another way of articulating the insights of the three frameworks Shapiro identifies; his thought provides the means whereby the ambitions of all three frameworks can be realized. This is so because Polanyi situates his account of embodiment and the role of the body in all knowing within the wider context of his understanding of personhood. He helps us recognize that, while the body plays an undeniably important role in all our ways of knowing, embodiment itself must be understood within the more comprehensive (i.e., more meaningful) framework of the purposeful strivings of responsible agents. Embodied knowing ultimately points to personal knowing.

Third, situating our understanding of the embodied character of knowledge within the wider context of the personal character of knowledge enables us to revisit the challenges associated with the question of interdisciplinarity. In the second section, I identified three particular problems associated with interdisciplinary studies: (first) the relationship between distinct areas of formal inquiry (e.g., empirical sciences, human sciences, fine arts, etc.), (second) the relationship between distinct areas of formal inquiry and what I called "transcendental" concepts (e.g., truth, goodness, beauty, reality), and (third) the correspondence between formal and informal experience. A Polanyian account of embodied cognition enables us to recognize these questions are not categorically equivalent; they each require a framework responsive to their particular demands, and we should not attempt to address any one of them through means more appropriate to another.

Relative to the first of these problems (i.e., the relationship between distinct areas of formal inquiry), Polanyi allows us to acknowledge the determinative role the body plays in all knowing while also enabling us to affirm that our knowledge cannot be entirely circumscribed by analysis of our embodiment. The dynamism and openness of the body is the way the body, so to speak, transcends itself (i.e., its contingent affordances) by cultivating ever-more complex and sophisticated forms of apprehension, conceptualization, and articulation. Thus, Polanyi provides us with a perspective on formal inquiry in some ways not dissimilar from that suggested by Michael Oakeshott in his *Experience and Its Modes*. Any formalized attempt to account for human experience (be it "historical," "scientific," or "practical") signifies nothing less than a whole world, one that draws on the unity of our informal experience and thus ineluctably seeks only one criterion of validation, namely, wholeness and coherence. Thus, formalized attempts to "harmonize" distinct disciplines cannot end in anything other than frustration or in an attempt (conscious or otherwise) to collapse one discipline into another.

However (and here Polanyi's thought enables us to go beyond both the frameworks Shapiro identifies as well as Oakeshott), this need not mean we are left without any chance of coordinating distinct fields of inquiry. What we need is a framework capable of subsuming the forms of apprehension, rationality, and articulation manifest in particular domains; here we pick up the second of the three problems of interdisciplinarity, i.e., the relationship between distinct fields of inquiry and "transcendental" categories. This is the point at which Polanyi's account of the supervenience of the person on the body becomes especially apropos: *it is within the more expansive and integrative horizon of responsible action that we should expect to adjudicate the relationship between distinct fields of formal inquiry*. Historical, scientific, and practical inquiry may each provide us with a world of concepts, rationality, and articulation, but none of them can or should be allowed to displace the higher, even more comprehensive logic of commitment and achievement.

This, then, takes us to the third problem with which we are confronted by the question of interdisciplinarity: how do we harmonize "theory" and "practice," how do we reconcile the formal and informal dimensions of our lives? Here the body again becomes important: when tempted (as it seems we always are) to lose ourselves in idealistic flights of fancy, it is our bodies that recall us to our vocations and hence to ourselves. In other words, *there is both a descriptive and an imperative dimension to our experience of embodiment*; when we lose sight of the latter, we find ourselves (both individually and collectively) suffering from the kind of moral and intellectual inversion that erodes any possibility of meaningful (personal) life. This is why the logic of commitment and achievement is so important: although our identity as embodied persons is in one sense a given and can be thought of very much as a gift (cf. Rolnick 2007, 144-185), there is also a sense in which neither embodiment nor a fully personal mode of living is guaranteed. Both require intense, sustained effort, the kind Polanyi suggested represents a "short-lived, limited, hazardous opportunity for making some progress … towards an unthinkable consummation" (*PK*, 405). And that, as Polanyi rightly noted, is exactly how one is placed when worshiping God.

Conclusion

William Poteat, it seems, was not exactly one for underplaying his philosophical hand: he suggested we are engaged in nothing less than a "disciplined, arduous, relentless, painful, and patient process of seeking a post-Cartesian intellectual equilibrium, working at every point against the grain of our entire culture" (Poteat 1993, 42). He established this new equilibrium with his account of our "mindbodily being in the world," whereby he sought to demonstrate the radical interdependence of our knowing and our being (Poteat 1981, 176). All of our formalized efforts to elaborate a meaningful account of the world and our place therein depend on the skillful performance of an expansive hierarchy of actions, coordinated and guided at every level by our sense of ourselves as responsible agents. This perspective enables us to understand our lives as the place, the "*room*" wherein we engage in the "liturgical shaping" of our experience in the effort to "comprehend love and death" (Poteat 1993, 35-36, emphasis in the original).

Poteat rightly discerned the reality at the heart of Polanyi's vision is that of the person, engaged in the risky but exhilarating enterprise of leveraging the contingencies of life in an effort to achieve an integral and perduring identity. This enterprise is not just *grounded* in our experience of embodiment; *it is itself the form of our embodiment*, the concrescence and actualization of our commitments. The challenge of interdisciplinarity thus simultaneously orients us both "down" and "up," down toward the primordial dimensions of knowing and being and up toward the affordances that call us out of ourselves and grant us the possibility of meaningful, purposeful lives open to a transcendent horizon of unimaginable promise.

REFERENCES

Clayton, Philip. 2004. *Mind and Emergence: from Quantum to Consciousness*. Oxford, UK: Oxford University Press.

Clayton, Philip, and Paul Davies, eds. 2006. *The Re-Emergence of Emergence: the Emergentist Hypothesis from Science to Religion*. Oxford, UK: Oxford University Press.

Collins, Harry. 2010. *Tacit and Explicit Knowledge*. Chicago, IL: University of Chicago Press.

Collins, Harry, and Robert Evans. 2007. *Rethinking Expertise*. Chicago, IL: University of Chicago Press.

Collins, Harry, and Martin Kusch. 1998. *The Shape of Actions: What Humans and Machines Can Do*. Cambridge, MA: MIT Press.

Crewdson, Joan. 1994. *Christian Doctrine in Light of Michael Polanyi's Theory of Personal Knowledge: a Personalist Theology*. Lewiston, NY: Edwin Mellen Press.

Fernández-Armesto, Felipe. 1997. *Truth: a History and a Guide for the Perplexed*. New York, NY: St. Martin's.

Frisina, Warren. 2002. The *Unity of Knowledge and Action: Toward a Nonrepresentational Theory of Knowledge*. Albany, NY: State University of New York Press.

Grosso, Andrew. 2007. *Personal Being: Polanyi, Ontology, and Christian Theology*. New York, NY: Peter Lang.

Johnson, Mark. 1987. *The Body in the Mind: the Bodily Basis of Meaning, Imagination, and Reason*. Chicago, IL: University of Chicago Press.

Juarrero, Alicia. *Dynamics in Action: Intentional Behavior as a Complex System*. Cambridge, MA: MIT Press, 2002.

Lowney, Charles. 2013. "From Epistemology to Ontology to *Epistemontology*." *Tradition & Discovery* 40, no. 1: 16-29.

Mackinder, Halford John. 1887. "On the Scope and Methods of Geography." *Proceedings of the Royal Geographical Society and Monthly Record of Geography* 9, no. 3: 141-174.

Meek, Esther. 2011. *Loving to Know: Covenant Epistemology*. Eugene, OR: Cascade Books.

Oakeshott, Michael. 1991 [1933]. *Experience and Its Modes*. Cambridge, UK: Cambridge University Press.

Polanyi, Michael. 1947. "What to Believe." *Credere Aude* (December): 9-10.

———. 1962 [1958]. *Personal Knowledge: Towards a Post-Critical Philosophy*. Chicago, IL: University of Chicago Press.

———. 1966. *The Tacit Dimension*. Garden City, NY: Doubleday & Company, Inc.

Polanyi, Michael, and Harry Prosch. 1975. *Meaning*. Chicago, IL: University of Chicago Press.

Poteat, William H. 1981. "Further Polanyian Meditations." *Pre/Text: an Interdisciplinary Journal of Rhetoric* 2: 173-187.

———. 1993. "Persons and Places: Paradigms in Communication." *The Primacy of Persons and the Language of Culture: Essays by William H. Poteat*. Edited by James M. Nickell and James W. Stines. Columbia, MO: University of Missouri Press, 1993.

Prinz, Wolfgang, Miriam Beisert, and Arvid Herwig. 2013. *Action Science: Foundations of an Emerging Discipline*. Cambridge, MA: MIT Press.

Rolnick, Philip. 2007. *Person, Grace, and God*. Grand Rapids, MI: William B. Eerdman's.

Rowlands, Mark. 1999. *The Body in Mind: Understanding Cognitive Processes*. Cambridge, UK: Cambridge University Press.

———. 2006. *Body Language: Representation in Action*. Cambridge, MA: MIT Press.

Shapiro, Lawrence. 2011. *Embodied Cognition*. New York, NY: Routledge.

Turner, Stephen P. 1994. *The Social Theory of Practices: Tradition, Tacit Knowledge, and Presuppositions*. Chicago, IL: University of Chicago Press.

———. 2014. *Understanding the Tacit*. New York, NY: Routledge.