BOLD VISIONS IN EDUCATIONAL RESEARCH

Beyond the Brain

An Agentive Activity Perspective on Mind, Development, and Learning

Igor M. Arievitch

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An Agentive Activity Perspective on Mind, Development, and Learning

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CHAPTER 1

INTRODUCTION

THE GOALS AND STARTING POINTS OF THE BOOK

This book presents a radical alternative to the rising wave of aggressive brainism and biological reductionism in contemporary psychology, philosophy, and education. It addresses major challenges and charts out possible steps in achieving what constitutes a daunting and elusive goal for contemporary psychology: constructing a coherently non-reductionist account of the mind by overcoming the entrenched dualisms which still plague major psychological frameworks and Western thought in general. It argues that such an account requires a consistently non-mentalist and non-individualist view of mental (psychological) processes, yet without discarding the individual mind altogether. In this vein, the book outlines an alternative agentive activity perspective on mind and development, conceptualizes from this perspective their relationships to the processes of teaching and learning, and lays out the important implications of this approach for psychology and education. The overall approach is based and expands on the recently influential Vygotsky-inspired framework of cultural-historical and activity theories. It is also generally compatible with several contemporary approaches, especially interactivism and the embodied cognition theories; yet it is distinct in its conceptualization of the human mind as a unique emergent property of human embodied meaningful activities that are not reducible to physiological processes in the brain.

It is necessary to clarify my usage of several terms from the start. First, by a *consistent* account of the mind I mean an account which would go in a conceptually coherent fashion from a most foundational conceptual perspective on the mind through elaboration and empirical research of key notions that emerge from this perspective, all the way to articulating critical implications for an educational vision and practices. Such a consistent account would also need to include the development of the mind across three major dimensions – phylogenetic, ontogenetic, and microgenetic dimensions. That is, it would need to address the evolutionary emergence of the mind, the individual psychological development, and the functional, or microgenetic, development of psychological processes (development within a limited period of learning).

Second, by a *non-reductionist* account of the mind I mean an account which would reduce the unique characteristics and functions of the individual mind neither "downwards," that is, to physiological processes in the brain, nor "upwards," that is, to linguistic discourses, social communication, or communal practices.

And third, by a *non-mentalist* account I mean an account which would conceptualize the mind without presuming the existence of a special "mental" (internal) realm for psychological processes and mental representations, presumed to be fundamentally different from the outside world, thus creating the dualistic Cartesian split between the body and the mind, the material and mental, the external and internal, and so on.

The main reason for the persistence of these crippling dualisms and the major stumbling block in constructing a consistently non-reductionist and non-mentalist account of the mind is identified in this book as the centuries-old implicit but powerful *contemplative fallacy* associated with the contemplative stance (spectator perspective) that continues to shackle many contemporary psychological frameworks. This contemplative stance underlies the "mind-body" and "internal-external" dualisms, since to a contemplating observer (spectator) the body and the mind inevitably and invariably appear as separate and incommensurable entities. As Descartes stated, the mind, in stark contrast to the body, cannot be measured by any spatial (dimensional) measures. In particular, the contemplative stance leads to a misleading "objectification" of psychological phenomena (mental representations, perception, memory, thinking, emotions, etc.), that is, to viewing these phenomena as separate "objects" which in self-observation seem to exist independently within a special "internal" realm that is profoundly different from everything in the outside world. This fallacious objectification of psychological processes creates a mentalist illusion that they take place "in the head" or in the brain.

The radical alternative discussed in the book – the *agentive activity perspective* – addresses these stumbling blocks and overcomes the contemplative fallacy by building on and advancing the key principles stemming from the activity-based framework which includes (a) the cultural-historical and activity theory in the works of Lev Vygotsky, Alexei Leontiev, and Daniil Elkonin, and (b) the theory of orienting activity (as an expansion of activity theory) developed by Piotr Galperin. This perspective also connects to important aspects of other recently developed and increasingly influential approaches – rarely drawn upon in the cultural-historical approach – such as the embodied cognition framework, especially its Piaget-inspired action-based theoretical branch. The concept of the embodied agent's object-directed activity serves as a pivotal point for re-conceptualizing the mind and its role in behavior. Consequently, in a radical departure from the traditional mentalist perspective, psychological processes can be understood as not taking place "under the skull" but as constituted by and emergent from the agent's activities out in the world. Within the agentive activity framework advanced in the book, the Cartesian "mind-body" and "internal-external" dichotomies are transcended and ultimately eliminated, without all together dissolving the agentive mind in "agent-less" contexts and processes (as typically happens in existing approaches due to implicit inconsistencies in their foundational assumptions).

The crux of the outlined perspective is that it conceptualizes the mind as an emergent property of the individual's active and constantly evolving engagements

with the world. This approach implies that the mind, specifically the human mind, is not a mysterious capacity that individuals are endowed with from birth, and is not an information-processing or brain activity strictly "in the head." Neither is the mind reduced, in this conceptualization, to the exclusively social levels of reality, such as participation in community practices, social roles, or narratives and discourses. Such a conceptualization makes it possible to avoid many old but constantly reincarnated traps of reducing the mind to something that it is not – activity of the brain cells or computer-like information processing, social interaction or linguistic discourse, narratives or internal storing of representations.

Along these conceptual lines, the development of psychological processes is analyzed across three major dimensions – phylogeny (evolutionary development), ontogeny (individual development), and functional genesis (or microgenetic development, i.e., occurring within a limited time of structured learning). A systematic analysis across these three dimensions is often claimed as necessary for a non-reductionist account of the mind, but is seldom consistently implemented in various theoretical frameworks, including the Vygotskian and activity theory extensions and interpretations.

The exploration in this book goes deeper than the now familiar templates typically used to portray the cultural-historical and activity theories. Recent scholarship has helped to establish the Vygotskian and activity research schools as the major influence in the present landscape of psychology and education and has turned their works into an indispensable source for new conceptualizations and ideas. The importance of this scholarship notwithstanding, a deeper examination, and often substantial re-conceptualizations of the key concepts developed in this school, such as mediation and internalization, is still necessary for advancing a consistently non-reductionist account. The analysis of the key concepts in Vygotsky's and activity theory offered in this book differs from their now established interpretations in a number of ways. In particular, this analysis uses the lens of the agentive activity framework for taking a fresh and deeper look at the developmental stages of semiotic mediation and internalization in order to demystify the power and the "magic" of these processes as giving rise to complex levels of psychological functioning. Such analytical strategy includes operationalizing the initial Vygotskian insights by exposing and describing the processes that underlie them.

This approach to the mind is also closely linked to a re-conceptualization of how learning and teaching are implicated in the processes that constitute human development. Whereas human development has been traditionally viewed as being separate from teaching and learning, the book explains how these three processes are inextricably linked. It follows the spirit of and elaborates upon the Vygotskian approach to teaching, learning, and development. Namely, based on the post-Vygotskian and activity studies and especially on Galperin's line of research, the book addresses the question of *how exactly* teaching-and-learning can lead development. In particular, it focuses on the critical role of learners' mastery of advanced cognitive tools, understood as reifications of culturally evolved social practices. This aspect of

the book therefore addresses the key problems at the intersection of psychology and education – it articulates a re-conceptualized perspective on the major driving forces of psychological development by placing the character of teaching and learning at the center of developmental processes. Importantly, a consistent agentive activity view of human psychological development and learning has fundamental implications for educational practices, which are also delineated in the book.

To date, a number of works have been conducted within the sociocultural and embodied cognition frameworks (e.g., Bakhurst, 2011; Clark, 2008; Noë, 2009; Overton, Müller, & Newman, 2008; Wertsch, 1998) in pursuit of conceptualizing the mind in a non-reductionist way, that is, "beyond the brain," which is also one of the goals in this book. These two lines of works have made a significant impact and helped to advance our understanding of the "externality" of psychological processes. Across several chapters of the book, I discuss different aspects of these works and return to the same authors in order to expand the analysis of their ideas that are relevant to the focus of a particular chapter. Based on such analysis, I argue that neither of these works makes an effort to integrate the key concepts and principles of the sociocultural and embodied cognition frameworks into a coherent non-reductionist and non-mentalist account on the basis of an agentive perspective. Also, importantly, these works do not strive to consistently connect their main concepts and principles to an educational vision and to address the major implications of a non-mentalist approach for teaching and learning. Partly because of this existing gap and the resulting lack of an agentive perspective in educational theorizing, education remains a conceptually disjointed area which is particularly vulnerable to aggressive brainism and to mechanistic interpretations of learning and development. Yet another goal of this book is to attempt to bridge the gap between a non-mentalist psychological account of the mind and an educational vision by using the agentive activity perspective as a foundation.

THE STRUCTURE AND MAIN TOPICS OF THE BOOK

Chapter 2 of the book makes a case for why the current bold claims made by many neuroscientists and psychologists to explain the mind and consciousness through research into the brain processes are grossly misleading in conceptual terms and are not supported by actual research findings. It also considers and summarizes the most advanced arguments against brainism recently put forth by a number of scholars in psychology, philosophy, anthropology, and education. At the same time, this chapter identifies the most important vulnerabilities and gaps in these arguments as one of the main reasons for why brainism not only persists but is currently on the rise. The main point advanced in this chapter is that a more consistently non-dualist perspective on the emergence and the unique role of the mind in behavior is needed in order to counter the biological reductionism in psychology and education.

Chapter 3 first examines the development of the concept of non-automatic (psychological) regulation in psychology, starting from historical figures including

William James and John Dewey and progressing to more contemporary accounts, such as research on automaticity in social perception, in order to explicate the important aspects concerning automatic and non-automatic regulation. After that, the chapter articulates Galperin's perspective on the emergence and functions of psychological regulation in evolution, as contrasted with automatic, physiological regulation. His works represent the most far reaching and, at the same time, the least understood part of the legacy of cultural-historical and activity theories. The key points from these accounts are highlighted and drawn together for constructing a non-mentalist and non-reductionist agentive activity perspective on the emergence and functions of the mind in evolution. This implies the radical move to overcome the Cartesian "mind-body" and "external-internal" dichotomies that still haunt the major theoretical approaches. I also explore the ideas recently put forth within the embodied cognition framework (particularly those stemming from the neo-Piagetian research) and discuss ways to incorporate them into a unified non-reductionist account while addressing their imbalances and gaps.

Chapter 4 analyzes the initial stages of the developmental trajectory of semiotic mediation in individual development (ontogeny), especially in early childhood. The same agentive activity perspective is applied to identify and explore theoretical gaps in Vygotsky's views on the development of semiotic mediation. The main argument is that the principles of cultural mediation should be broadened to include the earlier, pre-linguistic periods of development and pre-semiotic forms of mediation, from which semiotic forms gradually emerge. From this perspective, Vygotsky's notion of two separate lines in ontogenetic development – the natural and the cultural ones – is challenged and re-conceptualized. This is a critical step in constructing a consistently non-dualist account of psychological development.

Chapter 5 focuses on the later phases in the developmental trajectory of semiotic mediation, which include gradual internalization of semiotically mediated activities. Building on Galperin's ideas about the individual mastery of new activities, the agentive activity perspective allows to re-conceptualize Vygotsky's initial insights about internalization. This helps to bring about this concept's contemporary relevance and highlight its important role in a consistently non-mentalist account of the mind, contrary to many recent calls to dispose of this concept due to its potentially mentalist connotations. Internalization is revealed to be not about a transfer of anything from the outside world to "inside the head," but instead as having to do with the dynamic sequence of transformations in the uniquely human mastery of new semiotically mediated goal-directed activities, with a number of distinct characteristics.

Chapter 6 addresses the role of culturally evolved cognitive tools in the processes at the interception of development and learning. The agentive activity perspective, drawing on Galperin's research on different types of learning, allows to critically revise and operationalize Vygotsky's ideas about the leading role of teaching and learning in development (the task which he insightfully sketched out but never completed) by identifying a specific type of learning that has the potential to directly induce cognitive development. The critical role of the *quality* of cognitive tools

employed in learning that has been illuminated in this line of research is accentuated and connected to the broader questions about the driving forces of development, and to the still ongoing "nature-nurture" debates. In many of these debates, the two-factorial (nature/nurture) model of development is almost taken for granted. However, the "nature versus nurture" and the "nature plus nurture" options, presented in the two-factorial model as the only existing conceptual options, are exposed in the chapter from the agentive activity perspective as false choices that need to be replaced with a coherently dialectical alternative. Such a paradigmatic shift in perspective on development and learning bears major implications for education.

Chapter 7 (Conclusion) draws together and systematizes the main threads of the analysis and argumentation across the chapters to outline again the key ideas and to highlight their inter-connections, so that they stand as a viable and potentially productive framework for advancing a consistently non-reductionist and non-mentalist account of mind, development, and learning.

CHAPTER 2

THE MIND IS NOT IN THE BRAIN

A NEW WAVE OF BRAINISM IN PSYCHOLOGY AND EDUCATION

This book is *not* about the brain or the role of brain studies in psychology and education. Instead, it is about understanding the mind as a property of the active agent and as a form in itself of the agent's external activity, as well as the critical educational implications of such an understanding. So why start with a review of recent criticism of the "brain-based" approach that claims to provide full and complete explanations of consciousness, behavior and learning exclusively in terms of brain functioning? The first reason is my strong belief that the steadily rising wave of "brainism" coming from the "neuromarketing" branch of neuroscience, by generating misguided expectations while at the same time depleting valuable resources in these disciplines, poses a seriously detrimental threat to psychology, and in particular to education. This "brainism" is promoted with mind-boggling confidence by many authors in research and media who declare that there is "overwhelming evidence" that the causes of behavior and mind can be traced to brain processes, and announce the advent of neuro-explanations of all things human (e.g., Dennett, 1991; Kandell, 2007, 2016; Pinker, 2003, 2009; Prinz, 2012). In education such claims divert attention and resources away from explorations into the dynamics of teaching and learning as meaningful activities that require far more than focus on the brain.

The second reason to start with such a review is my belief that the current pushback by psychologists and educators who are skeptical about the surge of "brainist" neuro-explanations is inadequate and needs to be more conceptually deep and far-reaching. The final reason – and the most important one in the context of this book – is my hope that a more consistent, non-reductionist, and at the same time non-mentalist understanding of mind, mental development, and learning can emerge from deeper conceptual elaborations on and intensification of the growing opposition to "mindless neuroscience." In this chapter, I will review these recent critical advances that oppose "brainism" and offer a number of points that can further strengthen and unify this opposition.

A substantial criticism of brain reductionism has recently emerged in philosophy, psychology and education, as well as within neuroscience itself. Notable skeptical voices coming from neuroscience include, for example, the recent books by Lengrenzi and Umilta (2011) and Satel and Lilienfeld (2013). These authors eloquently challenge overly enthusiastic claims from pop-neuroscience and neuro-marketers, in actuality not supported by evidence, about the alleged link between certain mental activities and specific brain areas and processes. Conversely, the

authors discuss ample evidence that various brain areas and processes in fact support multiple and very different human activities, including different mental activities and problem solving, which makes establishing such direct links difficult if not impossible. Unfortunately, most of these sobering critiques developed within neuroscience do not articulate any philosophically viable alternatives to such unfettered brain reductionism on ontological grounds. Moreover, they express hope and even confidence that, with more effort and research, sometime in the future such a direct mind-brain link will be discovered. In their conviction that neuroscientific discoveries are on their way to this, many researchers call for patience, noting that contemporary neuroscience does not yet know even the most elementary facts about how the brain actually works (e.g., how the brain "recognizes" a straight line), let alone the relationships between the brain processes and the more complex mental states (e.g., see Marcus, 2012; Mausfeld, 2012). Yet, as many authors observe (Jarrett, 2015; Willis, 2015), so far these calls for caution and patience fall on the deaf ears of aggressive neuro-marketers (and, unfortunately, some neuroscientists and psychologists) who continue to spread, with great fanfare, numerous simplistic interpretations and outright neuro-myths.

Other neuroscientists, as well as psychologists and philosophers, have raised more general concerns about the explanatory value of the reductionist brain-based approaches for understanding the mind and behavior (Bem, 2001; Bissell, 1998; Carmeli & Blass, 2013; De Vos & Pluth, 2016; Harré, 2012; Hruby, 2012; Gazzaniga, 2011; Gold & Stoljar, 1999; Miller, 2008; Rose & Abi-Rached, 2013; Tallis, 2011; Uttal, 2001). These authors argue that neuro and biological reductionism misrepresents and simplifies human nature by claiming that it can be derived from and attributed to brain physiology. They emphasize that such complex social constructs as free will or responsibility, as well as presumably more "simple" meaningful actions and behaviors (such as driving a car), have no meaning in the "materialistic" and "deterministic" context of the brain processes.

Many critics point out that educational claims putatively derived from neuroscience are largely oversold and not supported by rigorous evidence. Indeed, the actual educational recommendations that can be derived from recent neuroscientific research are strikingly disappointing and, moreover, merely translate into fashionable neuroscientific terminology what has long already been known, thus producing an illusion of new discoveries (e.g., Bruer, 1997, 2006; Fischer, Goswami, & Geake, 2010; Varma, McCandliss, & Schwartz, 2008). These observations have been echoed by the findings that mere insertion of neuroscientific terms and references to brain research has a powerful convincing effect on non-experts' judgments about factually flawed and even nonsensical claims and recommendations (including guidelines for teaching and learning), masking otherwise obvious weakness of these statements and recommendations (cf. McCabe & Castel, 2008; Weisberg, Keil, Goodstein, Rawson, & Gray, 2008).

In mass literature and media, "brain" is routinely inserted into recommendations which, upon closer examination, at best repeat commonplace knowledge bearing

no relation to actual brain studies and findings. This exploitation of flippant neuro-references have reached such egregious levels that one could suspect that the real reason behind is that it is a cheap way to impress with "cutting-edge science." Alternatively, it is often an outright commercial ploy, since today "brain" is like "sex" – it sells. Take for example a recent book which in its title announces nothing less than the "Education Revolution," and in its subtitle claims to explain "how to apply brain science to improve instruction" (Sanzes, 2017). Although educational recommendations provided by the author are either stunningly trivial or nonsensical, the book is full of bizarre yet confident statements about brain research "findings." For example, the author proclaims that "the amygdala, the part of the brain in charge of emotions, has three universal needs: The need to feel safe, the need to feel wanted, and the need to be successful" (ibid., p. 99). The educational recommendation that follows is that teachers have to test what they teach on the criterion "that the amygdala must value it" (ibid., p. 152). Or consider the author's "innovative" explanation of higher order thinking, which presumably would not be possible without the cutting-edge brain research: "Higher level thinking is simply defined as the brain making connections, which allow students to link new information to old… based on their prior knowledge" (ibid., p. 54). Such pieces of "revolutionary" pop-science could be just shrugged off and forgotten were they not polluting the public discourses with fake explanations and false promises in the critically important area of education.

RECENT CRITICISM OF BRAINISM

An elaborate critical analysis of neuroscientific interpretations of psychological processes has been offered by Bennett and Hacker (2003, 2007). These authors argue that psychological attributes cannot be ascribed to the brain. Instead, processes such as remembering, thinking, and decision-making are done by people, not brains. They point to the confusion between levels of analysis in brain-related educational literature, such as in routine references to the "learning brain" (for one of the recent examples, see Sousa, 2011). They identify this error as the mereological fallacy, in which characteristics of the whole entity (in this case, the person) are mistakenly attributed to a part of the whole (in this case, the brain). This is a very important line of argumentation. However, its development by the authors, as well as an alternative that they offer, are presented mostly from the perspective of linguistic philosophy, discourse analysis, references to "psychological predicates," and the "normative connections of logic" rather than from a position that is concerned with the ontological legitimacy of mental processes and their distinct role in behavior. The authors' legitimate and valuable point is that neuroscience cannot in principle shed any light on many non-empirical, epistemological aspects of mind as

> an a priori enquiry into the web of epistemic concepts that is formed by the connections, compatibilities and incompatibilities between the concepts of knowledge, belief, conviction, suspicion, supposition, conjecture, doubt,