

Chapter Two

Embodying Autistic Cognition: Towards Reconceiving Certain “Autism-Related” Behavioral Atypicalities as Functional

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Autistic Disorder, Asperger’s Disorder and Pervasive Developmental Disorder-Not Otherwise Specified constitute the Autism Spectrum Disorders (ASDs).¹ Within psychiatry the ASDs are characterized by clinically significant atypical cognitive or behavioral profiles in three distinct areas: (i) social interaction, (ii) communication, and (iii) profoundly restricted activity and interests.² Interventions in the course of the ASDs in one or more of these three areas of cognitive or behavioral difference tend to target young children. Profoundly restricted activities and interests are targeted for various reasons, prominent among which is their role in (further) isolating the relevant children from their educators and peers. There are other reasons, of course, including the self-destructive nature of some of these behaviors (e.g., head banging, hair pulling, biting), and the fact that other behaviors are thought to interfere with cognitive development (e.g., fixation on objects or their parts). In this chapter, we are primarily concerned with those behaviors that are thought to interfere with the cognitive development of autistic persons.³ These behaviors, such as fixation on objects or so-called aberrant self-stimulation (e.g., finger flipping, hand flapping, mouthing objects), are typically thought to interfere with the relevant autistic person’s ability to learn.⁴ Teaching the autistic person to suppress, replace, or eliminate these behaviors will, according to this view, facilitate the development of greater cognitive functionality than would otherwise be the case.

A dissenting perspective to this characterization of ASD-related “aberrant behavior” is emerging. This perspective is partially inspired by autistic activists—often self-identifying as “neurodiverse”⁵—as well as by a growing concern that previous behavioral research has been misled by a language of deficit and impairment that has effectively obscured positive ASD-related capacities and the cognitive potential of perhaps many of those diagnosed along the Autism Spectrum.⁶ It is the contention of this dissenting perspective—which we will refer to as the Neurodiversity Perspective—that many of these so-called aberrant behaviors and restricted interests aid, rather than impede, autistic cognition and learning. On this view, teaching autistic children to suppress, replace, or eliminate atypical behaviors and abandon restricted interests could actually be hampering rather than helping their cognitive development (e.g., by raising anxiety levels that interfere with their ability to cognitively engage with the world).

In this chapter we critically examine the Neurodiversity Perspective and suggest a middle way between a conception of atypical behaviors as dysfunctions or impairments properly targeted for behavioral intervention, and one that sees them not only as inappropriately targeted for intervention, but also as beneficial to those individuals who express them. We will introduce two theories of embodied cognition as lenses through which these behaviors might be reimagined as functional and adaptive. The strength of these theories lies in providing a conceptual space within which researchers and autistic advocates can both interrogate previous behavioral research and explore more affirming ways of conceiving the behavior of those on the Spectrum. It is not our intent to deny that interventions in the lives of some of those diagnosed with ASDs are sometimes justified and desirable. Thus, we do not assume a one-size-fits-all approach to restricted interests or atypical behaviors diagnostic of ASDs.

Our first section will provide a brief orientation to the Autism Spectrum, particularly as it relates to stereotypies, restricted interests and rituals. Introducing the voices of some of those on the Spectrum will then motivate interest in the potential of Extended Mind and Enactive Cognition Theories for communicating and exploring a reconception of ASDs, which will be the focus of our next section. Our final section will suggest how these two theories both meet the concerns of those self-identifying as neurodiverse when encountering currently dominant scientific views on the nature and value of their atypical behaviors, while also helping to translate those concerns into novel avenues for research in the cognitive sciences.

AUTISM SPECTRUM DISORDERS

As mentioned in the introduction, the Autism Spectrum is typically characterized by a clinically significant deviance from the norm in capacities for reciprocal social behavior and communication, as well as “stereotyped behavior, interests, and activities.”⁷ Examples of behavioral atypicalities offered in the literature include difficulties with common social practices such as eye contact, sustaining interactive conversations beyond certain restricted interests over an extended period of time, adjusting to novel circumstances or breaks with routine, as well as engaging in repetitive behaviors that are commonly described as functionless or at least as obstructing the relevant individual from engaging with others and the world around them. As an individual matures they may exhibit significant difficulties initiating and maintaining social relationships, using language in nonliteral ways and achieving the capabilities necessary for independent living.⁸ “Pervasive Developmental Disorder-Not Otherwise Specified” is used when diagnosing individuals whose autistic traits, though clinically significant, do not meet all of the requisite criteria used to diagnose Autistic Disorder or Asperger’s Disorder. Asperger’s Disorder can be distinguished from Autistic Disorder on the basis of a lack of, absence, or significant delay in early language development, or delay in early cognitive development typical of children at or below the age of three.⁹

CONCEPTUAL AND EMPIRICAL ISSUES SURROUNDING BEHAVIORAL ATYPICALITIES

In charting what we regard as a middle way between the Neurodiversity Perspective and an understanding of the ASDs in terms of dysfunction and impairment, we will adopt “Restricted, Repetitive Behaviors and Interests (RRBIs)”¹⁰ as a description of the third diagnostic characteristic or feature of ASDs. This is to disambiguate “behavioral atypicalities,” as this term can also be used to refer to atypicalities in social domains discussed under the first and second diagnostic character or feature of ASDs.¹¹ As mentioned above, RRBIs are thought to both isolate the child from her educators and peers and interfere with the child’s active cognitive engagement¹² with her physical and social worlds. Complicating discussions of this third diagnostic characteristic or feature of ASDs is a great deal of heterogeneity in what qualifies as an RRBI. Given the diversity of behaviors historically bundled together under this umbrella term, it is not surprising that there has been extensive debate in both empirical and clinical circles over the relative merits of (sub) classificatory schemata, not to mention mixed—and often inconsistent—terminological usage among behavioral and cognitive psychologists,

neuroscientists, educators, and other related professionals.¹³ Nevertheless, for the purpose of determining their distinctive neuroanatomical localizations and biomechanical underpinnings—and from a clinical perspective, for identifying possible targets for behavioral and pharmacological intervention—it has been useful to differentiate this class of behaviors from apparently similar behavioral phenomena such as habits, mannerisms and gestures on the one hand, and more or less complex motor tics, paroxysmal dyskinesias and so forth, on the other.

If RRBIs form a distinct class of behaviors, then what are their central differentiating features or criteria of inclusion? On this matter expert opinion has been mixed and not uncommonly value laden. RRBIs have been variously described as involuntary, topographically invariant, rigid, repetitive, perseverative, consistent, ritualistic, rhythmic, and coordinated (i.e., patterned or even periodic, and therefore to some extent predictable in form and amplitude), as well as self-stimulatory and insensitive to changes in features of the environment, whether social or nonsocial. They have also been cast as having no apparent function, or as plainly purposeless, functionless, counterproductive, bizarre and inappropriate (i.e., both developmentally and socially); and in certain instances, as aberrant, pathological, dangerous, and destructive—although more sophisticated techniques of analysis and assessment, combined with greater attentiveness to the self-reports of those under study, have gradually eroded the tendency to leap to these sorts of conclusions.

Some researchers have suggested that RRBIs can be differentiated from other classes of behavior according to their (i) typical age of onset and developmental trajectory (i.e., the consistency and degree of fixity in their patterning over time); (ii) topographical location, frequency, and duration; (iii) association with specific antecedent sensations, urges and desires to perform; or (iv) (sometimes multiform) behavioral functions and characteristic maintaining contingencies. However, it has proven quite difficult to draw very sharp lines between, for example, RRBIs, habits, mannerisms and gestures, especially in cases where the behaviors in question are more complex, are susceptible to both endogenously and exogenously facilitated change over time, and are possibly communicative in nature (e.g., in cases of echolalia).

Murky and oft-debated terminological and classificatory issues aside, what *is* perfectly clear is the fact that RRBIs have been widely considered problematic, subjected to intense criticism and ultimately deemed worthy of clinical attention. Indeed, in practice the term “RRBI” carries diagnostic weight and has wide-ranging implications for the clinical treatment of those diagnosed with various developmental disorders, psychiatric disorders, and neurological conditions. Whatever RRBIs turn out to be, or what as of yet unforeseen functions they may turn out to serve, most agree that something has to be done about them, and quickly (i.e., while the brains of children are

at their most plastic and malleable). This sense of urgency appears to be largely due to the immediate impact RRBIs tend to have on the parents, educators, and peers of children who exhibit them, not to mention both their empirically demonstrated and perceived effects on personal safety (i.e., in cases where they may become self-injurious), prospects for learning and cognitive development, adapting to physical and social environs, and becoming socially accepted, well-integrated and esteemed.¹⁴

While it has been challenging to classify RRBIs in general, it has also been quite difficult to characterize their specificity in autism.¹⁵ This is true in spite of the fact that RRBIs occupy a rather large proportion of the behavioral repertoires of those diagnosed with ASDs,¹⁶ especially around the time when children have reached an age appropriate for securing diagnosis. There is widespread consensus that RRBIs are not unique to individuals on the Spectrum (i.e., as opposed to those diagnosed with other developmental disorders, psychiatric disorders, and neurological conditions; not to mention, RRBIs have been reported in a number of studies of typically developing children¹⁷). It is also generally accepted that none of these behaviors are type-specific to autism.¹⁸ Nevertheless, it has been shown that their frequency and severity correlate with “severity of illness, cognitive deficiency, impairment of adaptive functioning, and symbolic play.”¹⁹ Thus, their specificity among those diagnosed with ASDs appears to be quantitative in nature, not qualitative, and their rate of occurrence tends to be bound up with broader trends in the global development of the children who exhibit them.

RRBIs have been associated with the clinical profile of autism ever since Leo Kanner first described the disorder in the early 1940s.²⁰ Yet from an empirical standpoint, more than a half century later it was still clear that “work on the objective measurement of repetitive behavior in autism has not been done.”²¹ Today it remains apparent to neurobiologists that the “continuities and discontinuities in the normative and pathological expression of these behaviors have not been the subject of systematic study.”²² Ultimately, “little is known about the pathophysiology” of RRBI’s in general,²³ or about their developmental trajectory in children at risk for being diagnosed with autism in particular.²⁴ As such, it is not at all clear how RRBI’s can be reliably distinguished from other, apparently benign repetitive behaviors (e.g., strategies for acquiring and communicating information, as well as for building socially-“scaffolded”²⁵ abilities and more complex motoric skills) that may play significant roles in early infantile and childhood development.²⁶

For some further conceptual clarity in this area of autism research, we can usefully distinguish motor mannerisms from restricted interests and insistence on sameness.²⁷ Motor mannerisms can include auto-stimulation (e.g., finger-flicking, hand-flapping, spinning, rocking), awkward movements (e.g., walking on tip-toes), and “complex whole-body movements.”²⁸ Self-mutilation or damaging behavior (e.g., self-biting, head banging) falls under

this category. Restricted interests can include an extended and unusually concentrated interest in, and attachment to, whole objects or their parts (e.g., gazing at lights, fixating on the wheels of toy vehicles), video clips, or domain-specific facts (e.g., train timetables, calendars, dinosaurs). An insistence on sameness can be observed in certain rituals (e.g., lining up toys in rows, sorting objects into specific colors), routines (e.g., insisting that a certain route is followed away from and back to home, or that a certain route is taken in particular stores), and a difficulty negotiating even minor changes in daily routines or the physical layout of home or work. Under the RRBI heading, Szatmari et al. draw a distinction between Repetitive Sensory and Motor Behaviors (RSMB) and Insistence on Sameness (IS).²⁹ This cuts across two of the three subcategories we have suggested, with IS behavior incorporating what we have included under insistence on sameness as well as restricted interests.

There are at least four possible ways of construing RRBI conceptually. A basic or fundamental dichotomy will distinguish RRBI with and without function.³⁰ We construe “function” here as including the production of positive stimuli (e.g., watching certain video clips), reducing the impact of noxious stimuli (e.g., covering one’s ears to reduce sound perceived as too loud), and both expressing and regulating negative or positive affective and emotional states³¹ (e.g., certain instances of rocking or hand flapping). Under RRBI with function one can distinguish among adaptive behaviors (i.e., those which facilitate active cognitive engagement with physical and social environs), maladaptive behaviors (i.e., those which hinder such engagement) and neutral behaviors. Perhaps the clearest examples of maladaptive behaviors will involve self-injury (e.g., self-biting, head banging), but we also include behaviors that are maladaptive in certain contexts (e.g., tantrums in public spaces).³² We allow that adaptive behavior can include covering one’s ears to dampen noxious sounds or temporarily withdrawing from contexts in which one is overwhelmed by sensory stimuli. Our motivation for this allowance arises from the difficulties involved in nonarbitrarily excluding such behavior from that which is unproblematically regarded as adaptive. Think here of the difficulty of nonarbitrarily distinguishing typical and atypical individuals covering their ears in response to loud sounds or temporarily withdrawing from contexts of overwhelming sensory stimulation (e.g., a fair-ground or crowded party). Neutral behaviors might include auto-stimulatory behaviors that, while pleasant, merely relieve boredom. Depending on the behavior in question, each of these ways of functionally categorizing RRBI can be found in the literature in this area of autism research.

Of particular importance for our focus here, arguably only those RRBI that are maladaptive can be regarded as relatively *incontestable* legitimate targets for behavioral intervention.³³ That is to say, without (detailed) reference to the needs of the relevant individuals diagnosed on the Spectrum, it is

prima facie reasonable to think it is in their best interests to intervene when their behavior is maladaptive, but the same is not true of nonmaladaptive behavior (i.e., adaptive or neutral behavior).³⁴ This is not to claim that a defense cannot be effectively made for intervening in other RRBI, but this will require details that outline how such interventions are in the interests of those targeted. Pressures from self- or parent advocates gain greater weight when the behavior targeted for intervention is not maladaptive, even if it lacks a function. Arguably, in such circumstances the expressed wishes of those who are otherwise targets for intervention, or their advocates,³⁵ ought to figure in analyses of what is in their interests. This would be no less true if these individuals were neurologically typical (think here of age-matched children), and the current diagnosis of individuals on the Spectrum does not clearly warrant a differential treatment. Again, more details are needed that highlight how such interventions are in their interests.

It is important that we are not read as advocating that *only* maladaptive behavior warrants intervention. In very broad terms, good parenting involves shaping a child’s behavior over time to instill a character, or set of behavioral dispositions, that equip the child for engaging with the physical and social world. This is an important form of “behavioral intervention,” albeit of a less technical sort. A good parent is not limited to shaping a child’s behavior only when it is maladaptive (e.g., consider training the child in table etiquette, or to sit quietly during religious services). Arguably, interventions in the lives of young people on the Spectrum need not be viewed in a different light, though parents may rightly seek help from those who understand the needs, environmental salencies, and interests of their children (e.g., clinicians and educators who are trained to work with autistic children, and who are skillful in working with them, as well as autistic advocates). What should cause pause is targeting the RRBI of an autistic individual in a fashion that is disproportional to atypical behavior among neurologically typical individuals simply because that individual is on the Spectrum.

In exploring how nonmaladaptive RRBI might be reconceived in a more positive light, in the next section we turn to an examination of first-hand descriptions provided by two individuals on the Spectrum. These descriptions engage our previous discussion of RRBI by challenging widespread claims that such behavioral atypicalities are functionless or purposeless.

VOICES FROM THE SPECTRUM

The importance of including the views of those on the Spectrum in this discussion is at least threefold: (i) as we have suggested, the objections of self- or parent advocates to the targeting of behavioral atypicalities gain greater weight when the behavior targeted for intervention is not maladapt-

tive; (ii) all things being equal, acting in the interests of individuals should take account of their expressed preferences (when they are able to express them); (iii) should proxies choose, or advocates agitate, on behalf of others, attention should be given to careful reflection on what is in the interests of those in their care. These claims all share a common motive in respecting the interests of those whose behavior is targeted for intervention: (i) it is situated in the context of good parenting; (ii) it is grounded in the recognition that an appeal to best interests, even if indexed to accounts of flourishing, can ill afford to impose interventions that so depart from the expressed preferences of individuals that they cause suffering or disrespect their standing as persons; (iii) it reflects the danger of proxies or advocates acting in accord with their own interests, or greater social interests, rather than the interests of the individuals they represent. The situation is unsurprisingly acute when proxies or advocates have little or no experience with the embodiments of the individuals whose behavior is targeted for intervention. Autistics such as those quoted in what follows give voice to interests that may not be properly considered in contexts where decisions are routinely made by individuals who are neurologically typical. This is not to indict the motives of those making the decisions. It is, however, to encourage a healthy recognition of their epistemic fallibility.

Let us now turn our attention to some of the voices on the Spectrum. Amanda Baggs is an autistic activist and occasional video blogger who has received a great deal of attention for her 2007 web-video *In My Language*.³⁶ Although she is nonverbal, Baggs communicates through written word, a voice synthesizer and, according to her, repetitive behaviors. In her video, Baggs describes the repetitive behaviors she performs and records as follows:

The previous part of this video was in my native language. Many people have assumed that when I talk about this being my language that means that each part of the video must have a particular symbolic message within it designed for the human mind to interpret. But my language is not about designing words or even visual symbols for people to interpret. It is about being in a constant conversation with every aspect of my environment. Reacting physically to all parts of my surroundings.³⁷

Notice that Baggs's claims about her "native language" (i.e., her repetitive behavior) contrasts starkly with a standard view according to which such behavior is merely self-stimulatory. Such a view would place special emphasis on the rewards that Baggs receives from engaging in this sort of behavior (e.g., arousing sensory stimulation) while effectively ignoring the other possibilities that she presents here (more on these matters shortly). In characterizing her own repetitive behavior as communicative, interactive, and responsive, Baggs is implying that this behavior has cognitive value for her.

In the scene where Baggs is running her fingers through water, she writes:

In this part of the video the water does not symbolize anything. I am just interacting with the water as the water interacts with me. Far from being purposeless, the way that I move is an ongoing response to what is around me. Ironically, the way that I move when responding to everything around me is described as "being in a world of my own" whereas if I interact with a much more limited set of responses and only react to a much more limited part of my surroundings people claim that I am "opening up to true interaction with the world."³⁸

Here Baggs is clearly challenging the view that her repetitive behaviors are purposeless or merely self-stimulatory. Again it is noteworthy that from Baggs's perspective her behavior is not only purposeful but communicative and interactive. Perhaps more importantly, Baggs is calling upon her observers to understand her repetitive behavior as responsive to a remarkably broad range of stimuli in her surroundings. She contrasts this promiscuous responsiveness with what would typically be asked of her in contexts of intervention. In such contexts she understands her behavioral responsiveness as being artificially narrowed and constrained to suit the interests of others. According to Baggs, when her behavior is made to resemble that which is expressed by those who are neurologically typical her capacity to respond to the world is diminished considerably. Consider one final passage:

The way I naturally think and respond to things looks and feels so different from standard concepts or even visualization that some people do not consider it thought at all but it is a way of thinking in its own right.³⁹

Here Baggs suggests that her behavior has been misunderstood because of the differences that exist between the experiences and embodiments of those on and off the Spectrum. The reference points available to those who are neurologically typical are understandably informed by their peculiar styles of engaging the world cognitively, but perhaps these are poor (or at the very least, limited) grounds for understanding life on the Spectrum.

Dawn Prince-Hughes is an anthropologist and primatologist at Western Washington University. Diagnosed with Asperger's Syndrome when she was thirty-six years old, she has since recounted her years growing up on the Spectrum undiagnosed. She writes of her childhood:

As I got older, around four or five, I started to have fascinations with objects: kitchen utensils, rocks, tools. I like to watch tools and gadgets work over and over. Mixers and wrenches were great. I delighted in watching my grandparents use these things and perform the same motions over and over. I remember feeling like these tools and devices had *meaning* and *perfection*.⁴⁰

These statements shed light on Prince-Hughes's fascination with objects as well as the repetitive manipulations of objects by other people. As in the case

of Baggs's descriptions of her own repetitive interactions with the objects in her immediate environs, these encounters are once again described as meaningful rather than purposeless or even self-stimulatory. Though this description precludes more of a substantive claim than that, it motivates resistance to a unidimensional characterization of RRBIs, while also redirecting attention to their potential cognitive value.

Again thinking back to her childhood, Prince-Hughes writes:

My need for repetition extended to routes, places, and activities. When we went to the store, the cleaner, or the park, I would insist on going the same way every single time. I would silently acknowledge landmarks as the route unwound, whether they were the buildings and hills or the flowers and trees. I had memorized everything. To me, each flower, tree, building, and hill was a person, a being with its own personality and sense of agency. If I did not see it, it missed me and felt abandoned. I would panic if we did not drive or walk by it, because it would think I didn't exist anymore and would be worried. In turn, I felt like I would disappear if I were not hemmed in by the familiar and unchanging.⁴¹

The childhood personification of objects and organisms is unsurprising. If these are veridical memories, they contrast with descriptions of autistics as deficient in imagination. More importantly for present purposes, Prince-Hughes speaks here of interacting communicatively with her surroundings. This is strikingly similar to some of the claims made by Baggs above. Regarding these environmental objects and features as possessing agency, Prince-Hughes understands herself to be maintaining a relationship with them through her insistence on taking the same routes, visiting the same places and engaging in the same activities. Though we can doubt the ascription of sentience to these objects and features, the perceived purpose served by her insistence on sameness is striking.

The statement at the end of this passage is also worth noting. Prince-Hughes alludes, in other parts of her autobiography, to occasionally being lost in an overabundance of sensory stimulation. We suspect that her reference to "disappearing" refers to these experiences. The importance of being "hemmed in by the familiar and unchanging"⁴² hints at something distinctively cognitive. In particular, it hints at the function these regularly encountered environmental objects or features may have served in Prince-Hughes' general active cognitive engagement with her surroundings. Prince-Hughes seems to be claiming that her bodily relationship with these objects and features provided her with stability within which she maintained a sense of integrity and, presumably, from which she was poised to act. Interestingly, she writes later:

Most autistic people need order and ritual and will find ways to make order where they feel chaos. So much stimulation streams in, rushing into one's body without ever being processed: the filters that other people have simply aren't there. Swimming through the din of the fractured and the unexpected, one feels as if one were drowning in an ocean without predictability, without markers without a shore...Autistic people will instinctively reach for order and symmetry: they arrange spoons on the table, they line up matchsticks, or they rock back and forth, cutting a deluge of stimulation into smaller bits with the repetition of their bodies' movements.⁴³

What Prince-Hughes seems to be describing towards the end of this passage are cognitive "scaffolds." In this case, her ordering of environmental objects or bodily movements into symmetrical, repetitive sequences appears to facilitate a slowing down or "filtering" of perceptual experience, thus allowing her to better perceive the world around her. Prince-Hughes's claims need not be true of most individuals on the Spectrum to motivate a reconception of the kind of insistence on sameness she is describing.

These passages highlight the interests of two individuals on the Spectrum in actively engaging with their respective physical and social worlds in ways that are thoroughly embodied and interactive. It is through Baggs's repetitive behavior that she interacts communicatively with her environment, and in her youth it was through her insistence on sameness that Prince-Hughes maintained a relationship with her surroundings that furnished her with a sense of stability, integrity, and control. It is the thoroughly embodied character of the engagements captured in passages such as these that motivates our examination of two embodied theories of mind that are currently enjoying a significant amount of attention in philosophy and cognitive science. These relatively recently articulated theories seek to place cognition firmly in the body, thereby contrasting with theories that view mental states either as something other than physical (a position currently most often encountered in religious traditions concerned with survival after death) or as nothing other than brain states. As lenses through which to view the behavior of those on the Spectrum, these theories promise to offer autism advocates conceptual resources for challenging *carte blanche* approaches to RRBIs as pathological, while also unearthing imaginative possibilities for researchers keen to investigate the alleged functionality of RRBIs.

COGNITION, EXTENDED AND ENACTIVE

Over at least the last two decades⁴⁴ cognitive science, philosophy of mind, and the philosophy of cognitive science have seen the emergence of two broad approaches to human cognition—the Extended Mind Hypothesis and Enactive Cognition—which are committed to radically embodying the

mind.⁴⁵ “Embodying the mind” in the sense relevant to these approaches involves moving away from craniocentric or neurocentric views that cast the mind as bounded by the head or brain.⁴⁶ That is, both approaches see cognitive capacities, and the mental states that often accompany them, as emergent from mechanisms and processes extending beyond the head or central nervous system. Thus, these approaches require a view of the mind as situated at the intersection of brain, body, and world.⁴⁷ Though this broad conception of an embodied mind is shared by both approaches, they have arrived at this conclusion in importantly different ways. Some of the elements that distinguish them will be pertinent to how they might shed light on repetitive sensory and motor behaviors, as well as an insistence on sameness.⁴⁸ It is to a brief characterization of these distinguishing elements that we now turn.

Extended Mind

The Extended Mind Hypothesis is a broadly functionalist approach to mind.⁴⁹ According to functionalism, mental states such as beliefs, desires and preferences are functionally differentiated. Minimally, a mental state is the thing it is by virtue of its functional relationships (i.e., what it does) within a greater intentional system⁵⁰ (i.e., a system comprised of intentional states or their relations).⁵¹ For example, my belief that there is a tree outside my window is the thing it is because of its functional relationship with relevant perceptual processes, other mental states I possess (including other beliefs about trees, windows and the outdoors), and my behaviour in the world. It is important to note that the physical substrate of cognition is not restricted by this functional characterization of mental states.⁵² This last observation permits the development of a view of the mind as unbounded by the central nervous system and organic body. What is important to such a theory is that functional relations hold between states implicated in instances of information processing and facilitating an individual’s active engagement with her physical and social environments over time and across contexts. An example of extended cognition often appealed to in the literature involves mathematical calculations using pen and paper.⁵³ Imagine yourself engaged in long division, where the calculation is greater than what could be done “in your head” alone. As you write out each stage in the calculation process on paper, you are moving toward calculating the final answer. The whole process, once completed, qualifies as your mathematical reasoning, even though you could not have done this “in your head” alone and key steps in the calculation were accomplished by physically manipulating numbers on paper. Notice that the whole process is extended, including brain, body, and a part of the world. Another example involves the use of mnemonic devices to aid restaurant workers in servicing clients in restaurants or bars. Consider bartenders who use differently shaped or positioned glasses for particular (types of) drinks,

cues from ingredients already in glasses, or the clients themselves to efficiently mix drinks while interacting with clients and colleagues. These external cues off-load what might otherwise have to engage their working memory in ways that slow them down or even increase errors in service.⁵⁴ In examples such as these, the relevant link between the agent and her world is such that the “scaffolds” on which she depends are transparent (i.e., they do not require her attention as she uses them), reliable, and play a constitutive role in bringing about acts of cognition.⁵⁵

Enactive Cognition

Enactive approaches to human cognition regard the body behaving in the world as importantly implicated in cognitive processes.⁵⁶ What often distinguishes enactive from extended approaches is the former’s reliance on action in explicating the processes constitutive of cognition. Enactive theorists using perception as their example implicate an individual acting against and towards objects in her physical environment in such a way that, over time, her understanding of those objects in various contexts (as encountered from various angles or circumstances) facilitates perceptual experience.⁵⁷ Examples include perceptual experiences of such simple objects as tomatoes, apples, or coins as solid bodies, fully shaped and substantive, even though the occurrent perceptual information received through the eyes and visual neural pathways does not fully convey such content. That is, our visual experience of these objects transcends what is visually presented to us in moments where we experience them as three dimensional, temporally extended, full of flesh (for tomatoes or apples) or spherical (for coins). The understanding that facilitates such a rich perceptual experience emerges over time and across action contexts where we have encountered and engaged in physical or sensory contact with the relevant objects while situating ourselves differently in space. Without such differently situated encounters our perceptual experience of objects would be markedly diminished.⁵⁸

Since extended and enactive approaches allow that body and world can be partly constitutive of certain cognitive processes, how it is that we engage with the world bodily can play an integral role in perceiving and thinking. With this suggestion in mind we can begin to anticipate how theories of embodied cognition open up possibilities for reimagining the RRBIs exhibited by those on the Spectrum.

Embodying Autistic Cognition

It is worth returning briefly to the writings of Baggs and Prince-Hughes in order to chart connections between the lived experiences of some of those on the Spectrum and the two theories of embodied cognition explored above.

Baggs's descriptions of her repetitive behaviors fit nicely with an Enactive approach to cognition. Baggs understands her repetitive bodily movements, as well as her touching, smelling, and tasting of objects, as forms of promiscuous responsiveness to, and communication with, her surroundings. Perhaps better described as activities, they can be seen as enriching Baggs's interactions with environmental objects, fleshing out the content of her perceptual experience, and contributing to the constitution of her thoughts. From Baggs's perspective, a reduction of these intricate ways of responding bodily to the world in order to bring them in line with standards of "normality" (understood here as that which is more typical) effectively diminishes her active cognitive engagement rather than enhancing it.

Prince-Hughes's insistence on sameness, through which she is able to introduce order into her routines and activities, fits nicely with an Extended approach to cognition. Selective attention in the midst of rich and sometimes overwhelming sensory stimulation can be difficult to achieve for autistics such as Prince-Hughes. She describes this sort of stimulation as coming in waves, leaving her feeling as though she is drowning in a threatening, chaotic influx. Her insistence on sameness (e.g., ordering and sequencing objects) and engagement in repetitive behaviors (e.g., rocking) can be seen as reducing assaultive sensory stimulation and settling the world around her in ways that facilitate cognition. Viewed in this light, routines and repetitive activities play a constitutive role in subsequent cognitive engagements.

As lenses, Extended Mind and Enactive Cognition Theories offer fresh opportunities for understanding and investigating the alleged functionality of the RRBI exhibited by those on the Spectrum. They provide autistics such as Baggs and Prince-Hughes with theoretical tools that are useful for situating how they experience and understand the world. Because of their increasing relevance to research communities in the cognitive sciences, these theories offer rich, increasingly robust and coherent frameworks through which the perspectives of autistics can be communicated and taken up. For researchers, these theories recommend the reimagining of atypical embodiments and routines, because they suggest how different ways of engaging the world bodily might shape or constitute those processes that give rise to complex mental lives. When understood in this manner, these theories can help bridge existing divides over the nature of RRBI and their value to autistics by ameliorating the poverty of explanatory options currently on the table. It is to the poverty of these options that we finally turn.

THE POVERTY OF EXPLANATORY OPTIONS ON THE TABLE

A number of different theoretical perspectives have emerged over the past forty or so years in an effort to account for the occurrence of RRBI in both

human and nonhuman animals, several of which are geared specifically to explaining their occurrence in autistic individuals.⁵⁹ For example, it has been proposed that RRBI might in some cases function as reward-inducing, provide sensory stimulation, ameliorate impoverished or over-stimulating environments, or reduce stress that arises from abnormalities in sensory processing and social cognition. Or perhaps RRBI simply stem from abnormalities in inhibitory and control processes, as well as idiosyncratic styles of environmental exploration and delayed or atypical forms of learning.

The most influential theoretical perspective currently stems from the work of the behaviorist Ivor Lovaas, who described RRBI as learned or operant behaviors that are maintained over time by the kind of reinforcement they provide (e.g., repetitive flapping of hands in front of the eyes might provide visual stimulation, prompting a child to continue flapping their hands⁶⁰). Part of the enduring appeal of this approach is that it is often informed by, or else translates directly into, techniques of behavior modification. These techniques are frequently recommended to parents of autistic children as part of early intensive intervention programs designed to steer their children onto a more typical trajectory of learning and development. However, other research among behaviorists suggests that many RRBI are not *self-stimulatory* in the specific sense intended by Lovaas, and that the same behavioral form can be multiply functionally determined (i.e., it may serve more than a single function in different contexts). These diverse sources of evidence indicate that certain RRBI are maintained by social contingencies,⁶¹ as well as other external or environmental factors⁶² that may be both positively and negatively reinforcing for the individual in question.⁶³

Shifting our attention away from work among behaviorists, another influential psychological perspective hypothesizes that RRBI serve to reduce chronically high levels of arousal, stress, and anxiety.⁶⁴ This perspective gels nicely with the commonly held view that more socially acceptable repetitive behaviors (e.g., nail-biting, watching television), sometimes associated with relieving stress or anxiety, can be functional and adaptive. Building on this general line of thought, cognitive psychologists and like-minded philosophers have suggested that RRBI might function as coping strategies useful for regulating anxiety that arises from trying to navigate a social world ill-suited to the unique social-cognitive styles of autistic individuals (i.e., their alleged "mind-blindness"⁶⁵). Notice that this approach also fits with the embodied approaches to cognition outlined above. By contributing to the regulation of arousal, stress and anxiety, some RRBI might serve to facilitate or enable further active engagements with the environment, or allow individuals to return to such engagements after a brief period of withdrawal.

The arousal-regulation approach contrasts with another hypothesis, also from cognitive psychology, which suggests that RRBI arise directly as a result of specific executive dysfunctions. Executive functions are implicated

in various forms of cognitive and motoric inhibition, working memory, and related processes that play various roles in the execution of goal-oriented behaviors. The basic idea behind this alternative perspective is that autistic individuals may have difficulties inhibiting certain behaviors, regulating or controlling them once they have been initiated, or experience additional difficulties planning and generating alternative behavioral projects.⁶⁶ As such, they might literally get “locked into” a repetitive behavioral sequence, such as spinning in place, from which it can be difficult and perhaps even distressing to disengage.

Other psychological perspectives have attempted to explain RRBI as resulting from a tendency among autistic individuals to focus attention on apparently “inessential” or “irrelevant” environmental details, and a related weakness in the drive for “central coherence” (i.e., more gestalt-like or abstract forms of meaning) that is characteristic of information processing among typically developing individuals.⁶⁷ Some psychologists have also attempted to combine the sensory processing or weak central coherence approaches with the executive function⁶⁸ and arousal-regulation approaches.⁶⁹ Other such combinations are, of course, still possible. Some researchers have called for a yet more thoroughgoing pluralism, emphasizing that certain varieties of explanation are particularly well-suited to specific RRBI, while others may have limited applicability.⁷⁰

Unraveling the Options

Dysfunction plays a key role in all but the first of the explanatory options outlined here. What precisely is “dysfunctional” about RRBI as they are exhibited in individuals with autism? We set aside self-injurious behaviors as we have allowed for this class of behavior to qualify as maladaptive. As mentioned above, one of the major complaints that has been issued by parents and educators of children with autism is that RRBI such as hand-flapping, gazing at lights, noise-making or fixating on certain objects interfere with learning both *indirectly* and *directly*. It is claimed that RRBI interfere with learning *indirectly* because their frequent occurrence and recalcitrance tends to be disruptive and socially stigmatizing for both the children who exhibit them and their parents, complicating social interactions and potentially reducing opportunities for learning (e.g., in public schools). Since RRBI are “often perceived as age-inappropriate in form, focus, context, duration, or intensity,”⁷¹ parents and educators may well be ill-equipped to respond to these behaviors in a developmentally appropriate manner, and they may in addition feel paralyzed by shock, confusion or discomfort. More relevantly for our purposes, it is also claimed that RRBI interfere with learning *directly* by preventing learning from occurring at all. This is primarily because such behaviors are distracting and appear to completely absorb

the child’s attention, preventing her from staying on task both in the moment and over the days, weeks, and months it can take to undergo pivotal experiences and inculcate more complex habits of learning. This much has seemed just obvious.

It is, however, tremendously difficult to generalize in this area of autism research. The first-hand accounts surveyed above problematize a monolithic explanation of autism-related behavioral atypicalities, particularly when these behaviors are regarded as playing no positive cognitive role. Perhaps the most we can say at present is that *certain varieties of RRBI* (and remember that there are many) occurring at a relatively *high rate of frequency* may directly interfere with *certain kinds of learning, some of the time*, at least in the cases of *some children*—namely, those who exhibit particularly abnormal or delayed patterns of development.

We are concerned that empirical attention has been directed at only *certain kinds of learning*: namely, the sort that might take place in a preschool or classroom filled with typically developing children, based on a curriculum tailored to their styles of sensory, affective and cognitive engagement, information processing and so forth. Perhaps of more concern are studies of autistic children that appear to focus on classical conditioning as the litmus test of their learning capacity. For example, a study conducted by Koegel and Covert found that so-called lower functioning autistic children who exhibit relatively high-frequency stereotypies fail to learn simple discrimination tasks while they are engaged in these behaviors, and that the (punishment-based) suppression of these behaviors leads to increases in task performance.⁷² A parallel inverse relationship has been reported between stereotypies and spontaneous “appropriate” play with toys; although, once again, the frequency in occurrence of stereotypies among the subjects under study was very high, and only two “lower functioning” children were included.⁷³

Moreover, it is worth noting that researchers have been interested almost exclusively in the learning of *very young children* who are diagnosed with autism, so there is remarkably little data linking early childhood predictors of learning success with adult outcomes, whether or not the children in question have been involved in early intensive behavioral intervention programs. In a recent review of the current level of understanding (and alleged *misunderstanding*) of learning in autism, Michelle Dawson and colleagues at the Université de Montréal contend that “[d]escriptive and empirical accounts of autistics learning in unusual and successful ways have sporadically appeared and remained unexplained throughout the history of autism research.”⁷⁴ While it has been convenient for psychologists to presume that what is “unusual” about autistic learning is straightforwardly pathological in nature, this presumption has also made it quite difficult to account for the noteworthy successes that have been documented over the past sixty or so years, especially those that were recorded before the emphasis on early intensive behav-

ioral intervention programs.⁷⁵ Importantly, these successes include cases of children who reportedly engaged in high levels of RRBIs.

As lenses, the two theories of embodied cognition outlined above enrich the possibilities for understanding RRBIs and their role in autistic cognition. Learning occurs in autistics despite high frequencies of RRBIs, and even if these individuals remain restricted in what they learn, it need not be the RRBIs that are responsible for these restrictions. The passages from Baggs and Prince-Hughes suggest that it is *through* or *in virtue of* their RRBIs, not in spite of them, that they are able to actively engage with and make sense of their surroundings. Moreover, as Dawson and colleagues write,

Learning in autism is characterized both by spontaneous—sometimes exceptional—mastering of complex material and an apparent resistance to learning in conventional ways. Learning that appears to be implicit seems to be important in autism, but autistics' implicit learning may not map directly onto non-autistics' implicit learning or be governed by the same constraints.⁷⁶

The “spontaneity” to which Dawson and colleagues refer need not detain us. The suggestion that autistic learning may not follow the same constraints of neurologically typical learning or resemble the principles that underlie it does require a reimagining of cognition that both accommodates and highlights the significance of different styles of inhabiting and engaging the world bodily. The perspectives of people such as Baggs and Prince-Hughes provide further motivation for undertaking this reimagining because they are at least partly representative of the interests of those individuals whose atypical behavior is targeted for intervention. What we have been suggesting is that these authors' perspectives on their experiences and ways of understanding the world should not be dismissed out of hand as merely anecdotal or as incompatible with the theoretical frameworks currently available for guiding research in psychology and the cognitive sciences. Indeed, Extended Mind and Enactive Cognition Theories offer coherent and attractive theoretical spaces within which to begin reimagining the possible functions of RRBIs, particularly with respect to how they might enable learning and cognition.

CONCLUSION

Certain autistic advocates and their caregivers have argued against targeting behavioral atypicalities in interventions geared towards reducing the dysfunctions associated with ASDs. For those of us not on the Spectrum, it is important not to dismiss their arguments out of hand. There are options already on the table that may offer explanations for some RRBIs. High levels of arousal, stress, and anxiety are recurring themes in the autobiographies of individuals on the Spectrum. Behaviorally mediated mechanisms for arousal

and stress regulation, as well as strategies for coping with anxiety, might account for a subset of behavioral atypicalities while also explaining some of the value attached to these behaviors by those who exhibit them. Though treating arousal, stress, and anxiety might alleviate the frequency of such behaviors, it might not eliminate them. What is more important for our purposes, in other cases behavioral atypicalities might derive their value from helping to order the environment and “filter” an assaultive influx of sensory stimulation, thereby enabling engagements with the world that are more comfortable and productive for the autistic individual, perhaps even facilitating learning and cognitive development. We are suggesting that a broader range of frameworks through which to understand RRBIs can provide more affirming means of understanding their value to those on the Spectrum, while also presenting alternative avenues of inquiry for both experimental and clinical researchers. None of what we have advocated is intended to detract from the difficulties of those on the Spectrum whose symptoms are best understood and addressed through a lens of dysfunction or impairment. It would be a mistake, however, to approach the lived experience and challenges of those diagnosed as autistic without a variety of theoretical perspectives that can accommodate the diversity existing on the Spectrum. In stressing the value of Extended Mind and Enactive Cognition Theories, we hope to have added to this variety.

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NOTES

1. The *DSM* is currently undergoing revision, and proposed changes include adopting “Autism Spectrum Disorder” as a unitary diagnostic category that scopes over what is now distinguished under the categories of Autistic Disorder, Asperger’s Disorder, Pervasive Developmental Disorder-NOS and Child Disintegrative Disorder (see <http://www.dsm5.org/ProposedRevisions/Pages/proposedrevision.aspx?rid=94#>). Child Disintegrative Disorder resembles Autistic Disorder but differs in onset and course. After at least two years, and perhaps as much

as ten years, of development within the standard norm, a child loses many social and communicative skills and engages in repetitive or restricted behaviors (APA 2000). Unlike many individuals diagnosed with Autistic Disorder, the characteristics or features diagnostic of Child Disintegrative Disorder remain “relatively constant throughout life” (APA 2000, 78).

2. APA 2000.

3. From time to time, we use “autistic person” or “autistic individual” instead of “person with autism” or “individual with autism” (i.e., we do not adhere to person-first language). This reflects the insight of autistic activists that person-first language encourages the incorrect view that autism is accidental rather than constitutive of the identity of the relevant people on the Spectrum. We do not suppose that all of those on the Spectrum would agree with this choice (see Biklen 2005; Standing Senate Committee 2007), and so we stray from a rigid adherence to this convention.

4. Lovaas et al. 1971; Lovaas et al. 1971; Koegel and Covert 1972; Lovaas et al. 1979. By “learning” we mean the understanding still prevalent in psychology: a change in the behavior of an individual due to their experience (Drickamer et al. 2002; Rosenzweig et al. 2005). The emphasis on behavior, though a reflection of the influence of behaviorism in this area of psychology, also reflects the need to accommodate learning how (e.g., learning how to ride a bicycle) and learning that (e.g., learning that the sun is our local star). Types of learning, with implications for changes in the relevant individual’s intentional system (i.e., their mental states in relation to each other), include associative conditioning, operant conditioning, latent learning, observational learning, imitation, and so on (Drickamer et al. 2002).

5. Bagatell 2010. As we understand it here, the Neurodiversity Movement seeks a reconceiving of individuals diagnosed with neurological or neurodevelopmental disorders as fully human agents deserving of greater respect and tolerance than is currently experienced inside “the clinic.” This reconceiving can have at least two possible expressions: (i) one that charts a middle way between a view that pathologizes those traits or features characteristic of ASDs, and a social constructivism that would see the category of autism as an artifact of a health-care system with an overly narrow construal of “normality”; or (ii) another that recommends an outright rejection of thinking of ASDs in terms of disorder. (ii) is much more radical than (i), though both require a reconceiving of ASDs so that many on the Spectrum are best regarded as *different* rather than *dysfunctional* or *deficient*.

6. Dawson et al. 2007.

7. APA 2000, 69.

8. APA 2000.

9. APA 2000.

10. Szatmari et al. 2006, 582.

11. A further complication is our occasional use of “stereotypical behaviors” or “stereotypies” instead of “RRBI.” This reflects the appearance of these alternative terms in the scientific literature used in the relevant part of our discussion, and their exclusion of “insistence on sameness,” which is subsumed under “RRBI.”

12. Active cognition, as we use it here, occurs when the relevant individual plays an important role in the acquisition of knowledge (i.e., she learns by manipulating and experimenting with her environment), and decides, though perhaps not always consciously, what information, among the knowledge already possessed, will be used in future behavior (Gould and Gould 1994/99, 8; 114).

13. Turner 1999.

14. Jones et al. 1995.

15. Bodfish et al. 2000, 237.

16. Rapp and Vollmer 2005.

17. See, e.g., Troster 1994; Castellanos et al. 1996; Foster 1998; Harris et al. 2008.

18. Lewis and Bodfish 1998.

19. Singer 2009, 80.

20. Kanner 1943.

21. Lewis and Bodfish 1998, 81.

22. Lewis and Kim 2009, 115.

23. Lewis and Kim 2009, 126.

24. Symons et al. 2005.
25. "Scaffold" here merely denotes something that facilitates or enables something else.
26. E.g., Thelen 1981; for a relevant study of echolalia among autistic children, see Charlop 1983.
27. Szatmari et al. 2006.
28. APA 2000, 84.
29. Szatmari et al. 2006.
30. Problems with this basic dichotomy arise because the question of whether a particular RRBI "has a function" is likely to be sensitive to the developmental context in which it occurs—i.e., what at one stage in development is functionless might acquire a function as other developmental scaffolds settle into place (see Murdoch 2003).
31. We do not mean to suggest that certain affective or emotional states are, across contexts and individuals, essentially "negative" or "positive." These modifiers must be contextualized to remain sensible.
32. We grant these distinctions and examples while recognizing that, even with considerations of self-harm, what qualifies as maladaptive may be contextual. Certain examples of self-mutilation (e.g., nail biting, skin picking) are common enough to warrant occasional disapproval but usually not a diagnosis. This may reflect the importance of social norms at work in judging behaviors to be unacceptably harmful. As autistics can act in ways that are at odds with social norms, this may have undue influence on how their self-harming behaviors are perceived by others.
33. See the preceding footnote.
34. There is an epistemic problem lurking here: How exactly are we to distinguish between nonmaladaptive and maladaptive behaviors across variations in developmental trajectory (i.e., variations beyond what is common or typical)? It remains possible that what, at one point in development, is not adaptive (or perhaps even maladaptive) will later become adaptive.
35. There is a further question of who qualifies as an "advocate," particularly as this is an emotionally and politically charged decision space where the "real" interests of those directly affected are contested. This is a significant problem and one that may not be resolvable in a principled fashion (i.e., there may be no principle or rule that can definitively identify "the right" advocate). It is unclear whether this is a special problem for our view or one that attaches to any view that seeks to introduce proxies for those who are vulnerable and voiceless in decision spaces that are equally emotionally and politically charged.
36. Baggs's video *In My Language* can be viewed online at: <http://www.youtube.com/watch?v=JnylM1hl2jc>.
37. Baggs 2007.
38. Baggs 2007.
39. Baggs 2007.
40. Prince-Hughes 2002, 108.
41. Prince-Hughes 2004, 19–20.
42. Prince-Hughes 2004, 20.
43. Prince-Hughes 2004, 25.
44. The history of this emergent field of research can be given a much longer lineage of course. See Clancey 2009; Gallagher 2009.
45. For the purposes of simplicity we are using "cognition" and "mind" as synonyms.
46. Kiverstein and Clark 2009; Robbins and Aydede 2009.
47. Kiverstein and Clark 2009; Robbins and Aydede 2009.
48. Though we use Enactive Cognition Theory to focus on behavioral atypicalities expressed by individuals on the Spectrum, Klin et al. have examined some of the social difficulties faced by autistics using an Enactive model (Klin et al. 2003, 357). A similar approach to Klin et al. can be found in chapter 9 of Gallagher 2005.
49. Fenton and Alpert 2008; Levy 2007.
50. We use "intentionality" in Brentano's sense of the word: A belief is an intentional state because its representational content is about something (Harman 1998/2004, 602).
51. Levin 2008.
52. Levin 2008.

53. Clark and Chalmers 1998; Wilson and Clark 2009.
54. Beach 1993.
55. Clark and Chalmers 1998. For more examples of using environmental features or technological aids as aids for efficient cognition and action see Clark 2003.
56. Gallagher 2005; Kiverstein and Clark 2009.
57. Noë 2008.
58. For an application in the social domain see Klin et al. 2003.
59. For an overview of relevant psychological research, see Turner 1999; for an overview of psychological, genetic and neuropathological research, see Lewis and Kim 2009.
60. Lovaas et al. 1987.
61. Durand and Carr 1987.
62. Ahearn et al. 2003.
63. See also Kennedy et al. 2000; Cunningham and Schreibman 2008.
64. Hutt et al. 1964; Hutt and Hutt 1965, 1970; Kinsbourne 1980; Repp et al. 1992; Zentall and Zentall 1983.
65. See Baron-Cohen 1989; Carruthers 1996.
66. Ridley 1994; Turner 1997; Lopez et al. 2005.
67. Frith 1989; Frith and Happé 1994; Chen et al. 2009.
68. South et al. 2007.
69. Joosten and Bundy 2010.
70. Turner 1999, 844.
71. Cunningham and Schreibman 2008, 3.
72. Koegel and Covert 1972.
73. Koegel et al. 1974.
74. Dawson et al. 2008, 762.
75. Dawson et al. 2008, 762.
76. Dawson et al. 2008, 768.