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MENTAL INSTITUTIONS, HABITS OF MIND, AND AN EXTENDED APPROACH TO AUTISM

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Our lifeworlds are full of «mental institutions» [Gallagher & Crisafi 2009]: rich networks of norm-governed practices, artifacts, and traditions that shape how we attend to and interact with the world and others. But not everyone inhabits the same networks of mental institutions. For example, if the practice of law is a kind of mental institution (more on this later), then the specialized resources available within this institution will be unavailable to non-lawyers.

Within the last few years, philosophical discussions of mental institutions have arisen in the context of debates about "extended cognition": the idea that cognition may, at times, physically extend into the environment via the artefacts, practices, and institutions that support our intelligent behavior. But this idea has not received much attention in philosophical psychiatry.[1] In what follows, we argue that the notion of mental institutions can help better understand the origin and character of social impairments in autism, and also help illuminate the extent to which some mechanisms of autistic dysfunction extend across both internal and external factors (i.e., they do not just reside within an individual's head).

First, we provide some conceptual background. We focus on the

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[1] Although this has recently started to change. See, for example, Cooper [2017]; Davies [2016]; De Haan [forthcoming]; Fuchs [2018]; Hoffman [2016]; Krueger [2018]; Krueger & Colombetti [2018]; Maiese [2015]; Roberts *et al.* [forthcoming]; Sprevak [2011].

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connection between mental institutions and embodied habits of mind. Next, we discuss the significance of our view for understanding autistic habits of mind and consider why these embodied habits are sometimes a poor fit with neurotypical mental institutions. We conclude by considering how these insights highlight the two-way extended nature of social impairments in autism, and how this extended picture might assist in constructing more inclusive mental institutions for both neurotypicals and people with autism alike.

1. Extended (social) cognition

According to the hypothesis of extended cognition (HEC), the physical basis of cognition need not be confined to the head. Under certain circumstances, an individual's mental states can include processes unfolding not only in her brain and body but also within her environmental surround [Clark & Chalmers 1998]. By arguing that cognitive systems can include – i.e., be composed of – both biological and nonbiological parts, HEC explicitly challenges our thinking about where minds are and what they are made of.

A standard way to motivate HEC is by first identifying functional properties of some mental state or process and then showing that these properties can be realized by a heterogeneous system whose constituents extend across brain, body, and world. For example, one way to characterize memory is as the storage and retrieval of information to which an individual has ready and reliable access. Often, this information is realized entirely in the brain. But it need not be. It may be that individuals have equally as ready and reliable access to environmental resources – information encoded in notebooks, maps, smartphones, scraps of paper, and even other people – that, from the perspective of HEC, can be thought of as physical realizers of memory [Sutton 2010].

An important development in recent debates has been an increased focus on the *social* character of extended cognition. This social turn stresses not only the way that agents interact with a shared world but also the way the world, in turn, interacts with agents. It begins with the recognition that our cognitive practices arise within distinct sociocultural contexts, organized by specific material and normative aspects that shape the form these practices take [Gillett & Menary 2016; Kirchhoff 2012; Stotz 2010].

Consider the Mycenaean Linear B tablets, a script predating the Greek alphabet that was used to write the earliest form of Greek on clay tablets [Malafouris 2013]. These tablets were cognitive artifacts with a mnemonic function: record keeping of numbers and quantities. Importantly, their physical structure also afforded new possibilities for the *manipulation* and *representation* of information. While the information inscribed directly on the surface of each tablet was fixed once the clay dried, smaller versions of the tablets could nevertheless be manipulated like index cards; the *order* in which the smaller tablets were filed was significant, beyond the information encoded on the surface. This manipulable structure not only enhanced real-time problem solving. It also transformed the physical boundaries of the relevant problem space, thereby restructuring problem-solving processes for subsequent users. Consequently, cultural practices arose around the production and use of these tablets and the new ways of organizing knowledge they supported. These practices introduced new skills and affordances «that radically reconfigure[d] the cognitive ecology and the dynamics (including boundaries and connectivity) of the Mycenaean memory field for both current users and subsequent generations» [*ibid*., 81].

As this example shows, the social turn in HEC debates is important for several reasons. Not only does it foreground the central role others play in shaping our cognitive ecologies. Additionally, it foregrounds the extent to which these ecologies operate on us *at multiple timescales*. Early discussions of HEC mainly focused on real-time synchronic interactions with cognitive artifacts, such as an individual with Alzheimer's consulting his ever-present, memory-augmenting notebook in order to find his way to the museum. However, by socializing HEC in this deep cultural-historical sense, recent work [e.g., Cash 2010; Fabry 2018; Hutchins 2011; Kirchhoff 2012; Malafouris 2016; Menary 2013; Merritt 2013] productively broadens debates to highlight the structuring role cognitive extensions play at a *diachronic* scale. As Cash puts this idea, «Our institutions, our languages, and the very cognitive and normative practices within which we cognize have been shaped by us to make cognition easier, and they have, in turn, shaped the cognitive abilities

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that language-enabled humans possess» [Cash 2010, 664]. In sum, these reflections show us how our cognitive ecologies – and the material artifacts and norm-governed practices that comprise them – scaffold the diachronic development of cognitive, affective, and behavioral habits distinctive of those who share that milieu.

2. Mental institutions and their embodiment

From the perspective of HEC, our habits of mind – broadly speaking, our characteristic ways of attending to, interpreting, and engaging with the world – are ecologically structured. This structuring process begins early in development. For example, even before they learn language, infants are enculturated into nonverbal habits of shared communication – rhythmic turn-taking contingencies, forms of emotional expression, patterns of vocalization, attention regulation, etc. – that extend their social-cognitive competence and reflect the norms, values, and patterned practices distinctive of their sociocultural milieu [Krueger 2013]. These patterned practices are the building blocks of what Gallagher calls «mental institutions»: assemblages of social practices, institutions, and norm-governed artifacts that furnish access to novel abilities or features of the world otherwise beyond our reach [Gallagher 2013; Gallagher & Crisafi 2009]. As we will see, mental institutions both extend cognition and present top-down constraints on embodied habits of mind.

For Gallagher, mental institutions have two core features: (1) they consist of cognitive artifacts and practices produced in specific times and places, and (2) they are activated in ways that extend our cognitive processes when we engage with them in the right sort of way [Gallagher 2013, 6]. Mental institutions take many forms: from academic, scientific, legal, and religious institutions to more encompassing cultural and economic practices. Gallagher's focus is on the various ways mental institutions extend cognition insofar as they open up otherwise inaccessible cognitive processes.

For example, he argues that certain legal judgments – like evaluating the legitimacy of a particular claim – are only possible when individuals engage with artifacts and practices that make up the mental institution of law. This institution furnishes an array of external resources (e.g., contracts, systems of rights and laws, norm-governed procedures, precedence, etc.) that enable individuals to manipulate and work through large amounts of information they couldn't otherwise process without this external support. Similarly, when dealing with complex theories and phenomena, scientists' reasoning processes may extend across a heterogeneous system composed of both internal and external resources: tools, props, and various representational devices, along with the suite of norm-governed practices governing their use [Toon 2015]. Guided by these kinds of observations, Gallagher concludes that if we say that cognition supervenes on individual artifacts like notebooks, maps, smartphones, and microscopes, we ought to likewise grant cognitive status to mental institutions designed specifically to augment our cognitive practices [Gallagher 2013, 7].

This is not the place to independently motivate Gallagher's argument.[2] Instead, we are interested in exploring how the notion of mental institutions might help us better understand the origin and character of social impairments in autism, and more specifically how this notion can illuminate the extent to which some mechanisms of autistic dysfunction extend across both internal and external factors. In order to do so, it will be useful to bring Maiese's [2018] recent analysis of habits of mind and social institutions into this discussion. This analysis is useful because it can fruitfully enrich Gallagher's discussion of mental institutions, and the social turn in HEC more generally, in two key respects: by stressing both the *embodied* and potentially *maladaptive* character of mental-institution-supported habits of mind.

For Gallagher, mental institutions remain largely external to the individual.[3] They are persistent environmental resources that users can, for a time, integrate with and thus use to extend their cognitive capacities in order to accomplish some otherwise-inaccessible task. Their cognitive impact is therefore short-lived and primarily positive: to productively augment institution-specific habits of mind. However, Maiese's analysis helps illuminate how the values, norms, beliefs, and practices that make up mental institutions become *internalized and sedimented* within an array of unreflective bodily habits that shape our everyday interactions. Additionally, Maiese draws our attention to the fact that not all of these habits of mind are positive. While mental institutions cultivate practices and habits that promote human flourishing – e.g., by enhancing cognition or facilitating richer forms of human connection – they may also contribute to maladaptive habits that interfere with overall well-being. In other words, we are *vulnerable* to maladaptive manipulation by mental institutions in a way that hasn't been widely considered within HEC debates.[4] Understanding the latter will be particularly useful for understanding the connection between mental institutions, on the one hand, and social impairments and the experience of alienation in autism, on the other.

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[2] See the papers in Merritt and Varga [2013] for critical engagements with his view.

[3] To be fair, this is somewhat misleading because HEC challenges strict internal-external boundaries when it comes to thinking about the location and constitution of cognitive systems. And nothing in Gallagher's analysis is inconsistent with Maiese's discussion of habits of mind and social institutions – although Maiese adopts an enactive perspective instead of HEC. For our purposes, what's important is that Maiese focuses on specific aspects of our bodily practices that aren't given explicit attention in Gallagher's discussion, and which can therefore fruitfully supplement his account.

2.1. Mental institutions and habits of mind

Bodies are socially saturated and socio-normatively laden. This claim involves more than just the benign observation that cognition and affectivity are always socially contextualized. More substantively, we argue that cognition and affectivity are directly modulated by the artifacts, relationships, and norms – the mental institutions – distinctive of that context. Our habits of mind depend upon both internal and external constraints.[5]

Some examples will help clarify this point. Consider the unreflective way we fluidly adopt different styles of speaking, gesturing, behaving, and expressing emotions as we negotiate different interpersonal contexts. Extravagant expressions of humor (big open-mouthed smile, loud laughter, dramatic gestures) may be welcome during a night out with friends, but they will be perceived as disruptive in more formal settings such as a professional meeting or place of worship. So, we adjust our expressive style accordingly as we move through these different contexts. Similarly, we attend to and interpret the world in a different way when out for a casual night with friends than we do, say, when participating in a sporting event or political rally, or when negotiating an unfamiliar city for the first time. For example, one might be more inclined to pick up on and respond negatively to a dirty look from a stranger – or conversely, respond positively to a flirty glance – when buttressed by the encouragement of boisterous friends than when alone; when touring a city with an architectural historian friend, we will be more attuned to specific features of familiar buildings and built spaces. Evaluative appraisals of *salience* are modulated by our interpersonal context.[6]

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[4] Although Sterelny [2010] is attuned to this possibility, as is Slaby [2016] (discussed in more detail below).

[5] See Higgins [2017] for a complementary discussion of the ways that social norms become embodied in habitual practices.

This variation is not simply a matter of internal constraints, such as feeling timid during an important meeting with one's peers and not speaking up. Again, the key point is that contextual differences in habits of mind are also heavily modulated by *ecological* constraints: background forces, norms, and expectations – constitutive features of mental institutions – that contour the dynamics of our bodily responses and patterns of appraisal as we negotiate different environments. Crucially, we are *vulnerable* to being manipulated by these ecological constraints without our full awareness or consent. For example, unspoken gender norms appear to nudge women to both expect and accept more frequent interruptions than male counterparts [Hancock & Rubin 2015].

Slaby's [2016] discussion of the impact of workplace culture on cognition and affect helps to further illuminate the structuring role mental institutions play in shaping maladaptive habits of mind. Mental institutions distinctive of a particular workplace involve a complex, multi-format assemblage of shared norms, practices, and artifacts that scaffold processes of cognition and appraisal required to accomplish various tasks. Like the legal reasoning case discussed previously, certain forms of medical knowledge, for instance, might only be possible when individuals actively integrate with the artifacts, technologies, and norm-governed practices of a clinical workspace [Pimmer *et al.* 2013]. But workplace ecologies can infiltrate habits of mind in a more subversive and potentially disruptive way.

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[6] See Ratcliffe [2016] for a discussion of this idea in the context of self-disturbances in schizophrenia.

As Slaby [2016] observes, the «presence bleed» of contemporary knowledge work – the expectation that one should constantly be online and available for work-related communication via email or instant messaging – erodes clear-cut boundaries between work time and leisure. Ubiquitous communication technologies like smartphones are deeply entrenched in everyday habits of mind and usefully extend an array of cognitive practices. Yet, as Slaby notes, the timing and location of our engagement with them can also reinforce institutional practices and expectations (e.g., persistent availability, expectations regarding how quickly problems ought to be dealt with) that potentially encourage maladaptive habits of mind: lingering feelings of guilt, excessive responsibility, anxiety, or an inability to "unplug" and enjoy non-work-related activities. This is because individuals are drawn into modes of interaction, often by way of affective attunement and habituation to interaction patterns and modes of valuation that are normative for that domain [Maiese 2018, 13]. So, an individual who starts working in a high-pressure corporate workplace may find themselves coming to *diachronically embody* the maladaptive norms of that mental institution, even if they are not fully aware of it (e.g., reflexively checking for new email every few minutes when at home or out with friends). Additionally, their ongoing adherence to these norms ensures that the larger mental institution they are part of will continue to structure this maladaptive ecology for *other* agents. For example, if an individual's colleagues establish a workplace culture where important email communication routinely occurs beyond regular working hours, their failure to adhere to this norm will stand out and they may face increasing pressure to adapt — at the expense of their home life. Workplace ecologies can in this way diachronically "invade" individuals over time, and at a concrete bodily level. They establish top-down constraints that selectively nudge individuals toward maladaptive habits of mind that can potentially have deleterious downstream effects on their own and others' wellbeing.

These observations about the interactive dynamics between mental institutions and embodied habits of mind highlight two points important for what follows. First, they remind us that mental institutions are not free-standing things that are largely external to the individual, apart from the limited duration of our synchronic engagements with them. Rather, we are bodily «tattooed» [Grosz 1994] by these institutions, insofar as they structure the range of cognitive, affective, and behavioral possibilities available to us as we inhabit them. Second, the ongoing enactment of our habits of mind collectively feed back onto and reinforce the mental institutions that constrain them. Embodied subjects are not only shaped by their social world; they also help shape their social environment through active and reactive contributions and responses. Importantly, however, this observation further shows us that while subjects do tend to act in ways that reinforce norm-governed mental institutions, they can also defy and undermine them, in a range of different ways and to varying degrees. These acts of resistance can lead to new habits of attention, thought, feeling, and bodily response [Maiese 2018, 14-15]. We now explore this latter point by looking at the interrelation between mental institutions, embodiment, and social impairments in autism.

3. Instituting impairment: autism, embodiment, and mental institutions[7]

We now apply the previous discussion to autistic spectrum disorder (ASD). Building off the earlier discussion of HEC, mental institutions, and habits of mind, we argue that some of the social impairments distinctive of ASD aren't entirely located in individual heads. We discuss the significance of this view for understanding autistic habits of mind, why these embodied habits of mind are sometimes a poor fit with neurotypical mental institutions, and finally how these insights might help us construct more inclusive mental institutions.

First, some background. ASD is a complex developmental disorder spanning a spectrum of social, communicative, imaginative, and behavioral abnormalities. These abnormalities are wide-ranging and can vary with age and individual ability. They include non-verbal communicative deficits; repetitive behaviors; difficulties in adjusting actions to suit a social context; fixated interests, especially in sensory qualities of objects; and diminished imaginative capacities, such as the absence of pretend play in childhood [Frith 2003; Rutter & Schopler 1987; Stone *et al*. 1997]. ASD also tends to include deficits in affective bonding and emotion-related behavior [Hill & Frith 2003; Hobson 1993]. For example, people with ASD often avoid direct eye gaze, have difficulty seeing and interpreting social cues in gestures and facial expressions, and struggle to connect and develop relationships with their peers. Most behaviors needed to establish and regulate social interactions are impaired in ASD [Gallese & Rochat 2018].

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[7] The notion of «instituting impairment» is taken from Merritt [2013].

There is currently no consensus about the exact cause of autism. However, the five «big ideas» [Frith 2003] dominating current debates – *Theory of Mind*-style explanations; *Weak Central Coherence Theory*; *Executive Function Theories*; the *Broken Mirror Neuron Hypothesis*; and the *Social Motivation Hypothesis* – are, despite other differences, committed to an internalist position insofar as they conceive of the root cause of ASD as located inside the head of the individual. But there are reasons to be skeptical of this internalist commitment.[8] For our purposes, two worries are salient. First, these approaches overlook key *embodied* and *relational* features of ASD social impairments, including both self-other mapping deficits that arise from a dysfunction of perception-action coupling systems [Rochat *et al*. 2013], as well as distinct ways of moving, perceiving, and emoting that define autistic ways of being-in-the-world [Constant *et al*. 2018; Krueger forthcoming; Leary & Donnellan 2012]. Second, they overlook the central role that *interpersonally-distributed* factors play in shaping dysfunctions characteristic of ASD [De Jaegher 2013; Gallagher & Varga 2015; Hobson 2002; León 2019; Schilbach 2016]. Conceptual resources from the previous discussion of HEC and mental institutions can help address these worries and thus be used to develop richer characterizations of ASD experience.

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[8] See Bolis *et al*. [2017] and De Jaegher [2013] for further discussion.

3.1. "Local" mental institutions and (neurotypical) embodiment

Gallagher's discussion of mental institutions primarily focuses on large-scale mental institutions such as legal systems and academic research practices. However, we find mental institutions at work at a more local level, too, regulating the dynamics of our everyday engagements with others. For example, commuter trains, grocery stores, and cocktail parties all can be understood as institutions that regulate our behavior and interactions. These local mental institutions are particularly relevant to understanding some of the social difficulties that people with ASD face on an everyday basis.

One of the lessons of Gallagher's analysis of mental institutions, particularly when conjoined with a complementary discussion of embodied habits of mind, is that much of our everyday understanding of others and the world more generally is carried not just by brain-based processes or internal "mentalizing" strategies, but also by beyond-the-head practices designed specifically to make us intelligible to one another as social agents [Zawidzki 2013]. These norm-guided practices are examples of «epistemic actions» [Kirsh & Maglio 1994] that have several cognitive functions. They can *augment* cognition by furnishing access to novel abilities and/or features of the world otherwise beyond our reach (e.g., rendering legal judgments). This augmenting function is Gallagher's primary focus. But they can also *extrapolate* existing capacities, the way that microscopes bring small things into the range of visual detection; and they may even *convert* phenomena accessible in one modality into a form accessible in another, the way that sonar devices with visual displays convert worldly events (e.g., flight paths) into a digital-representational format [Humphreys 2004]. And they do these things while regulating our behavior in predictable ways.

Consider playing chess. Chess-playing occurs within a mental institution: it is an activity organized by a rich network of rules, practices, artifacts, and expectations that exist prior to token episodes of chess-playing. What is important here is that, when playing chess with someone, we needn't rely upon an intracranial capacity to *infer* our opponent's desire to play chess and intention to do so fairly; rather, we see these things directly *in their playing*, just as they see our desires and intentions in *our* chess-playing behavior. In other words, we make ourselves intelligible to one another by conforming over time to the institutional practices, rules, and strategies of playing chess [McGeer 2015]. Following Humphreys [2004], we can say that the local institution regulating this shared practice converts a computationally demanding folk psychological task (making inferences about others' mental states) into an easier perceptual-motor task (jointly coordinating our behavior to shared rules of chess) – and, in doing so, reduces the descriptive complexity of the environment by guiding our attention to salient features of our opponent's norm-governed behavior. It thereby assists us with the process of selective attention.

This is just one example of a local mental institution. They take many forms, and vary with time and place: playing games; lining up in the queue to board a train or airplane; placing our menu on the table as a signal that we're ready to order; taking a phone call in the vestibule to avoid irritating fellow rail travelers in the quiet carriage; pausing in a conversation to let the other person finish a thought; or expressing our disapproval with a well-timed eyebrow raise. Van Dijk and Rietveld [2017] give the example of being seated in a "silence area" in a train, so that talking is not really an option; nor is drinking from the bottle of water that belongs to one's neighbor. For those operating within a mental institution, «certain models of expectancy come to be established, and the patterns, which over time emerge from these practices, guide perception as well as action» [Roepstorff *et al*. 2010, 1056]. Many aspects of social understanding are in this way carried by the world, scaffolded by the norms and routines that regulate our embodied interactions and habits of mind, and which have their social significance built into them [McGeer 2001]. Understanding others involves bringing shared norms to bear, for our sense of what people generally do and what they can be expected to do is linked to our views about what they *ought* to do. The ability to apply norms and identify situations in which relevant routines are appropriate rests on a capacity for navigating different social contexts.

To return to HEC, we thus see that local mental institutions extend cognition at multiple timescales. On a *synchronic* basis, they provide the regulatory tracks upon which token episodes of social interaction run and acquire their normative character. This is a process that begins at birth, within infant-caregiver interactions. However, repeated engagements with local mental institutions also shape the *diachronic* development of bodily practices and habits of mind that are *responsive* to the institutions, habits that become sedimented within our more general way of negotiating the world. That is, we learn these rules over the course of learning and socialization; when our behavior conforms to shared expectations, it is met with approval and praised; and when it fails to conform to these expectations, it is met with disapproval and sanctioned. Over time, we internalize norms and shared expectations in the form of characteristic behavior or habits.

What Rietveld and Kiverstein [2014] call «situated normativity» encompasses norms of adequacy and inadequacy associated with habitual behavior within sociocultural settings. As children engage with aspects of the environment, their performance is subject to normative assessment as better or worse, and as more or less correct given situational demands. As a child attempts to name various colors, for example, she receives feedback about the appropriateness of her responses and thereby acquires a feel for which uses are acceptable. Which color names are better or worse, correct or incorrect, depends in part on sociocultural norms and the specific setting in which color naming takes place [*ibid*., 332]. Whereas a more coarse-grained categorization may be appropriate when it comes to traffic signs, clothing and home décor may call out for a more nuanced naming of particular shades. What counts as adequate-color naming will depend, in large part, on what other members of a sociocultural practice do. Along similar lines, a child will learn how to engage with various tools and artifacts, and how to conduct herself within various social settings. When she fails to conform to expectations, she will receive feedback that alerts her to this. She will, for example, be corrected or scolded, often by way of subtle indicators of social disapproval.

To return to ASD, the salient point is this: because people with ASD lack (for reasons discussed below) experiential access to many of the normative features of neurotypical mental institutions, they are excluded from the social-cognitive benefits and embodied habits of mind these institutions help to develop, regulate, and sustain. Such difficulty is connected to the fact that in neurotypical institutions shared expectations often are conveyed by way of very fine-grained nuances in tone of voice, facial expression, posture, and other forms of body language. Because people with ASD lack access to these fine-grained features, they find it difficult to engage effectively with others within these social environments. This lack of experiential access is a key part of the social difficulties they face in negotiating the neurotypical world. Importantly, however, this lack of access is not an "in principle" exclusion. There are ways of co-constructing more inclusive mental institutions that both neurotypicals and people with ASD may jointly inhabit and benefit from.

3.2. ASD, embodiment, and alternative habits of mind

We now unpack this claim in several steps. First, we discuss the explanatory significance of the distinct ways that people with ASD experientially inhabit and use their bodies to move, express emotions, and attend to the world and others. Next, we consider why and how the distinctive character of these embodied habits of mind fail to be responsively integrated into neurotypical mental institutions, and how this lack of integration leads to social difficulties for people with ASD.

To begin with the first step: people with ASD often use their bodies in ways that, from a neurotypical perspective, may appear unusual or off-putting. For example, they may repeatedly shrug, squint, pout, or rock back and forth; repeatedly touch specific objects; turn away when someone attempts to speak with them; maintain unusual or inert postures, or appear to get "stuck" in indecisive movements; have difficulty imitating actions; and require explicit verbal or gestural prompts to perform an action [Donnellan *et al*. 2012; Leary & Donnellan 2012; Robledo *et al*. 2012]. A particularly salient example is a delay in conversational responses. Donnellan and colleagues found that twelve young adolescents with minimal verbal skills, all of whom were labeled developmentally disabled or autistic, were, in fact, capable of offering competent conversational responses – but only, on average, after fourteen seconds of silence [Leary & Donnellan 2012, 57]. However, such a delay violates neurotypical norms; most neurotypicals would likely find a pause this long uncomfortable and either change the subject or abandon the conversation. ASD habits of mind thus often fail to mesh smoothly with neurotypical institutions.

These are embodied ASD habits of mind observable from an external third-person perspective. However, first-person reports also indicate that people with ASD often experience their bodies in ways that differ from neurotypicals. They experience difficulties controlling, executing, and combining movements – from fine motor control, grip planning, and anticipatory movements, to more complex action-sequences like reaching for a book, dancing, or negotiating a crowded hallway [Eigsti 2013; Leary & Hill 1996; Whyatt & Craig 2013]. This feeling stems not simply from measurable coordination difficulties but also from a *felt* sense of diminished agency and loss of bodily control, including diminished proprioceptive and kinaesthetic awareness [Blanche *et al*. 2012; Robledo *et al*. 2012]. These experiential difficulties can lead to challenges when it comes to effortlessly engaging with the environment and other people – that is, smoothly integrating with neurotypical patterns of interaction and habits of mind. Some individuals with ASD are aware of these differences. One person reports that «I was sitting on the floor and when I got up after looking at a couple of books, my friend said I got up like an animal does» – and furthermore, that although she is aware that her patterns of movement and habits of mind are different from those of neurotypicals, she remains unaware of *how* they differ, exactly [Robledo *et al*. 2012, 6].

These reports lend support to the idea that people with ASD exhibit a kind of perceptual «style blindness»: an inability to perceive expressive or stylistic qualities of neurotypical patterns of movement and embodied habits of mind [Krueger forthcoming]. As a result, they lack experiential access to socially-salient information needed to fit into and become responsively regulated by the expressive norms governing neurotypical mental institutions. When we speak of stylistic qualities of movement, we are referring to the specific *way* an action is performed, its qualitative character.[9] For instance, we can reach out to shake someone's hand in a *friendly*, *aggressive*, or *indifferent* manner; similarly, a smile can be *cold*, *sarcastic*, *confident*, or *wry*. These are expressive qualities of actions that carry socially salient information. To understand the intentions and meanings of others' actions, it is not enough to simply see the action itself. We must also perceive the social information encoded in its *style*, that is, within the qualitative dynamics of its performance. And these stylistic features often are very subtle. Consider the fine-grained difference between a *friendly* kiss and a *lover's* kiss, as well as between *playful* sarcasm and *angry* sarcasm. To distinguish between the two types of kiss, one must attend to the highly specific features of the kissing movements as they unfold; and to distinguish between the two types of sarcasm, one must attend to highly specific, often subtle, features of the speaker's volume and intonation patterns.

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[9] Daniel Stern [2010] calls these qualities «forms of vitality».

There is evidence that individuals with ASD lack perceptual access to these fine-grained stylistic features of actions. Several studies highlight atypical processing of low-level, sensory, and perceptual information in ASD [Dakin & Frith 2005; Happé 1999; Mottron *et al.* 2006]. There is evidence, for instance, that children with ASD struggle to extract relevant information from biological cues [Rutherford *et al.* 2006]; they also fail to correctly interpret human activities portrayed in point light displays [Blake & Shiffrar 2007]. Other studies have found that both children and adults with ASD struggle to decode visual information found in facial expressions and actions [Ashwin *et al.* 2006; Atkinson 2009; Hubert *et al.* 2007; Teunisse & de Gelder 2001], and to extract social-emotional information from vocal cues [Philip *et al.* 2010].

Perhaps the most powerful support for style blindness in ASD is found in a recent study by Rochat *et al.* [2013].[10] Twenty high-functioning patients with ASD, along with twenty neurotypical controls, watched a series of short video clips involving two people sitting across from one another at a table, performing different actions. These actions included giving a high five, shaking hands, pointing, caressing the other person's forearm, taking the other's hand, giving or retrieving a mug, and holding up their hand to signal "stop". In these clips, the same type of action was performed with a different style: e.g., a vigorous handshake in one clip, a gentle handshake in another. Participants in the study viewed different combinations of these action clips and were then asked to make

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[10] See also Gallese and Rochat [2018].

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judgments about them. While participants with ASD were similar to neurotypicals in identifying *kinds* of actions (e.g., handshake vs. high-five), they made frequent errors when making judgments about the *style* of different actions, including difficulty recognizing similar styles (e.g., gentle) across different actions (e.g., handshake vs. high five). According to the authors, these findings advance previous work insofar as they suggest that style blindness is not limited to imitative contexts (e.g., such as when an individual with ASD is asked to imitate an observed action) but that it is, rather, a *primary* deficit – a perceptual inability to extract socially salient information from the qualitative kinematics of others' actions [*ibid*., 1922].

This style blindness is significant for how people with ASD inhabit – or fail to inhabit – neurotypical mental institutions. This is because, within such institutions, people's desires and expectations often are communicated via fine-grained modulations in the qualitative dynamics of action and expression. These modulations include an ever-so-slight raise of the eyebrows to signal skepticism, subtle modifications in the tone of voice to signal sarcasm, or subtle changes in posture to indicate, "you're annoying me; stop talking". Conforming to social norms and expectations within neurotypical institutions requires that subjects be able to gauge fine-grained features of other's bodily expressions. However, subjects with ASD find it difficult to attend to these features; and without perceptual access to stylistic features of neurotypical patterns of behavior, people with ASD often cannot smoothly participate in the everyday practices of neurotypical institutions and understand the emotions and intentions of others. Moreover, the ability to *imitate* these expressive kinematics is a core skill needed to be responsively regulated by the different (local) mental institutions through which we move on a day-to-day basis [Lakin *et al*. 2003; Meltzoff & Decety 2003]. However, without this capacity, people with ASD lack fluent access to the cognitive and emotional benefits these ritualistic practices confer [Ingersoll 2008; Stewart *et al*. 2013]. Because subjects with ASD have difficulty detecting these subtle social cues, they sometimes turn to general rules or explicit theorizing strategies to compensate [Shanker 2004].

From the perspective of HEC, there is a sense in which children and adults with ASD can be said to inhabit different social worlds – understood as collections of mental institutions that shape distinctive habits of mind – than neurotypicals do [Klin *et al*. 2003]. But, to be clear, it's not the case that people with ASD lack access to any kind of norm-governed mental institution whatsoever; nor is it the case that they lack access to *neurotypical* mental institutions entirely. Clearly, they do have some degree of access to the latter. People with autism are part of our shared world and, to varying degrees, responsive to what neurotypical people say and do. Rather, the point is that they have diminished *practical fluency* when it comes to engaging with neurotypical institutions, the way a non-scientist may lack practical fluency with a microscope or set of research practices and thus lack access to the cognitive benefits and habits of mind scientific institutions confer. This diminished practical fluency occurs because the signposts for social interaction found in neurotypical institutions typically are too fine-grained and nuanced for subjects with ASD to gauge.

Nevertheless, the social worlds and mental institutions of ASD may have their own norm-governed character, one not easily accessible to neurotypical partners. This becomes clearer by first observing that some of the unusual movements, behavior, and habits of mind people with ASD exhibit are more than meaningless reflexes or nervous tics. Rather, they are environmentally responsive and often situationally-appropriate; they play an important role in helping individuals with ASD adapt to and negotiate changing environments. For example, patterns of "self-stimulation" or "self-stims" – which consist of behavior like hand-flapping, finger-snapping, tapping objects, repetitive vocalizations, or rocking back and forth – may be context-sensitive habits of mind that help to organize incoming sensory flows in order to manage the physical, perceptual, and emotional demands of a given situation [Leary & Donnellan 2012, 51]. In cases where this incoming information threatens to be overwhelming (i.e., hypersensitivity), self-stims can occlude signal noise and down-regulate the individual's anxiety; alternatively, in cases where the individual requires heightened arousal in order to better access salient information (i.e., hyposensitivity), self-stims can have an arousal-generating, attention-directing effect. Self-stims thus can be understood as a way to strengthen selective attention so that subjects can ignore irrelevant information and focus on what is important; this puts them in a better position to gauge relevant social cues. So, treatment programs that have traditionally tried to eliminate or suppress self-stims [e.g., Azrin *et al.* 1973] have failed to see their norm-governed character and the positive role they may play within autistic habits of mind.

Additionally, there is evidence that many social difficulties people with ASD face result from the fact that neurotypical norms, expectations, and mental institutions simply aren't adequate to meet the needs or idiosyncratic features of ASD habits of mind. What makes them inadequate is that these norms and expectations often are unspoken, highly context-specific, and communicated by way of nuanced body language. Because subjects with ASD rely primarily on straightforward verbal expressions and more coarse-grained body language to communicate, neurotypical mental institutions often do not suit them.

To see this, note that within neurotypical mental institutions, the ability to use language appropriately and understand what others say goes well beyond knowing the literal meaning of the expression used. It also involves an appreciation of the setting in which the speech occurs. The meaning of "Mark is at the bank", for example, is highly context-sensitive, and rests on knowledge about whether Mark frequently goes angling at the river or instead works at Chase Manhattan [de Villiers *et al.* 2007, 295]. de Villiers and colleagues found that subjects with ASD do not have much difficulty with the appropriate use of language when it comes to the content of literal speech, but exhibit pronounced deficits with respect to figurative speech. This makes it difficult for them to understand metaphor, irony, and conversational implicature [*ibid.*, 315]. Understanding the meaning of figurative speech requires that subjects attend to fine-grained contextual features and gauge the desires and intentions of those who are speaking, but these desires and intentions typically are conveyed via highly nuanced aspects of bodily expression and comportment. Because subjects with ASD find it challenging to engage in this sort of selective attention, often they say things that lack relevance to the hearer, do not anticipate what hearers will want to know, and take figurative speech (including metaphor, sarcasm, and irony) literally.

But it is possible to design institutions that are a better fit for subjects with ASD. This observation is strengthened by findings that high-functioning autistic people report pleasurable and efficient interactions with *other* autistic persons, even when they struggle to connect with neurotypical mental institutions [Komeda *et al*. 2015; Schilbach 2016]. This is because their interactions with other people with ASD take place within mental institutions governed by ASD-friendly norms and expectations. In these settings, the norm is for people to speak in more straightforward terms, relying primarily on literal language rather than metaphor and more clearly signaling the use of sarcasm. For example, if a subject with ASD wants someone to stop talking, the expectation may be that s/he simply will say “stop talking”. This request will not be understood as rude or impertinent but as clear and competent communication of her desires. So, it’s not as though people with ASD lack social competence *entirely*. Rather, their impairment is heightened when trying to inhabit and engage with mental institutions that aren’t organized in ways designed to accommodate ASD habits of mind.

In sum, these insights suggest that the disturbance of breakdown leading to social impairments in ASD is, in an important sense, a *two-way* impairment, and not just confined to the head of the individual with ASD [McGeer 2009, 310]. It includes environmental features: neurotypical institutions that lack the flexibility and inclusivity needed to responsively mesh with ASD habits of mind. As we’ll see in the final section, such considerations may have important consequences for thinking about intervention and therapeutic strategies.

4. Further implications and conclusion

As we’ve discussed, ASD has for several decades been thought to consist in a Theory of Mind deficit. This assumption has shaped treatment and intervention strategies, which have generally been geared toward helping individuals develop their individual mentalizing capacities [Begeer 2014]. However, based on the previous considerations, we can highlight at least two shortcomings of such approaches. First, they overlook the role that embodied and interactive features play in shaping characteristic impairments and offer few resources for addressing these features. Second, they presuppose that social difficulties in ASD consist in a failure to conform to normative expectations of neurotypicals, without acknowledging (or offering resources to address) the two-way nature of these impairments.

If, as we've argued, autism is fundamentally an embodied and relational phenomenon – and not simply an in-the-head cognitive deficit – intervention strategies should be tailored accordingly. One promising strategy is music therapy, which can involve listening, singing, or joint music-making. Srinivasan and Bhat [2013] observed that music-based interventions are attractive for individuals with ASD for three reasons. First, they can address core impairments in joint attention, social reciprocity, and verbal and nonverbal communication, along with comorbidities of atypical perception, motor performance, and behavioral problems. Second, children with ASD often have enhanced pitch processing abilities and musical memory compared to typically developing children and therefore may find these interventions particularly pleasurable [Heaton 2003]. Third, music-based activities can provide non-intimidating contexts to interact with musical instruments and other people by engaging in predictable musically-guided interactions with social partners [Darrow & Armstrong 1999].

Evidence suggests that these kinds of musical interventions positively impact various forms of development, including communicative, social-emotional, and motor development. For example, music therapies can facilitate verbal and gestural skills in children with ASD; enhance social skills such as eye contact, joint attention, mimicry, and turn-taking; and support the improvement of fine and gross motor skills [Srinivasan & Bhat 2013]. This can help subjects with ASD to strengthen their ability to gauge fine-grained social cues and their capacity for "body-reading". In a music setting, subjects do rely on bodily expression to communicate – but eye contact, bodily expressions, and mimicry are more exaggerated than in standard neurotypical settings. And because they are punctuated by changes in musical tone and rhythm, they are easier for subjects with ASD to detect.

In this way, musical activities like listening, singing, and joint music-making provide a regulative context in which children with ASD can work with neurotypicals to construct alternative musically-guided mental institutions. Musically-generated auditory and rhythmic signals can regulate attention and movement in a number of ways: by influencing the timing of motor neuron discharge; decreasing felt muscle fatigue; facilitating automatic movements by providing predictable temporal cues; improving reaction time and response quality through facilitated responsive anticipation; and providing auditory feedback for proprioceptive control mechanisms [Thaut 1988, 130]. Music can thus serve as scaffolding for the development of selective attention and strengthen subjects' ability to detect social cues [Krueger 2019; Maiese 2016].

In addition, the opportunity to interact in a musical setting may help counteract the tendency of some subjects with ASD to withdraw from social interaction. Shanker [2004] notes that because subjects with ASD are sometimes overreactive and feel overwhelmed by visual or auditory stimuli, they may avert their gaze, put their hands over their ears, or avoid interaction with others. Likewise, McGeer [2001] suggests that in an effort to manage sensory experiences, subjects with ASD might feel the need to shut out other people; however, that makes it difficult for them to develop social and communicative skills. The more a child with ASD avoids interaction with others, the more s/he is deprived of the sorts of experiences needed for social development. Musical settings provide a place where subjects can come together with other people and begin to develop an intuitive understanding of what others are thinking and feeling. Coordinated musical improvisation, for example, may help give participants a sense of being part of meaningful shared activity. There are often moments in music therapy where there is a "buzz" between the two players, for example when they spontaneously come together at a cadence point or somehow know when to end or where to go next [Maratos *et al*. 2011, 92]. This kind of "communicative musicality" allows subjects to experience a kind of relating that is very different from that involved in talking, and yet offers them an avenue to overcome social isolation. In addition, it allows those who feel "out of sync" with the social world to "get back into the groove" of interacting with others.

To conclude, these reflections harbor an important lesson: instead of expecting children and adults with ASD to responsively conform to neurotypical mental institutions, we ought to explore ways of developing more *inclusive* institutions – in both everyday as well as therapeutic contexts – that provide a common space for individuals to get into the

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groove with one another. To reach subjects with ASD, we need to move beyond "fixing" the heads of single individuals and instead consider ways of adjusting the social world.

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Keywords

Extended Cognition; Embodied Cognition; Habits of Mind; Autism

Abstract

We argue that the notion of "mental institutions" – discussed in recent debates about extended cognition – can help better understand the origin and character of social impairments in autism, and also help illuminate the extent to which some mechanisms of autistic dysfunction extend across both internal and external factors (i.e., they do not just reside within an individual's head). After providing some conceptual background, we discuss the connection between mental institutions and embodied habits of mind. We then discuss the significance of our view for understanding autistic habits of mind and consider why these embodied habits are sometimes a poor fit with neurotypical mental institutions. We conclude by considering how these insights highlight the two-way, extended nature of social impairments in autism, and how this extended picture might assist in constructing more inclusive mental institutions and intervention strategies.

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