

UC Santa Cruz

UC Santa Cruz Previously Published Works

Title

Autism, aspect-perception, and neurodiversity

Permalink

<https://escholarship.org/uc/item/0ds1n4b6>

Journal

Philosophical Psychology, 32(6)

ISSN

0951-5089

Author

Dinishak, Janette

Publication Date

2019-08-18

DOI

10.1080/09515089.2019.1632426

Peer reviewed

Please cite the final, published version in *Philosophical Psychology*:
<https://doi.org/10.1080/09515089.2019.1632426>

Autism, Aspect-Perception, and Neurodiversity

Abstract: This paper examines the appeal, by philosophers, to Wittgenstein’s notion of “aspect-blindness” to illuminate our understanding of autistic perception and social cognition. I articulate and assess different ways of understanding what it might mean to say that autists are aspect-blind. While more attention to the perceptual dimensions of autism is a welcome development in philosophical explorations of the condition, I argue that there are significant problems with attributing aspect-blindness to autists. The empirical basis for the attribution of aspect-blindness to autists is questionable, but even if it turns out that future empirical work on autistic perception and social cognition decisively supports the attribution of some forms of aspect-blindness to autists, the descriptive and explanatory fruitfulness of the notion of aspect-blindness is limited in important ways. To better capture autistic experience, we should broaden our framework to include conceptualizing autists as engaging in forms of *aspect-perception*.

Keywords: seeing aspects, aspect-blindness, Wittgenstein, autism, neurodiversity

Word Count: 9858

Recently there has been an upsurge in two-way interactions between philosophy and psychopathology. On the one hand, there is a substantial interest in incorporating empirical results about various psychiatric conditions (e.g., addiction, autism, depression, schizophrenia, and psychopathy) into philosophical debates. The thought is that reflection on forms of psychopathology can illuminate our understanding of the “normal.” On the other hand, philosophers use philosophical positions and concepts to further our understanding of psychiatric conditions.

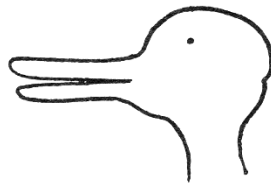
This paper examines an instance of the second kind of interaction between philosophy and psychopathology: the appeal, by philosophers (Overgaard, 2006; Stawarska, 2010; Proudfoot, 2013) to Wittgenstein’s notion of “aspect-blindness” to characterize autists’ difficulties understanding others’ mental states. My aim is twofold. The first is to articulate different ways of understanding what it might mean to say that autists are aspect-blind. The

second is to critically assess the appeal to aspect-blindness to characterize autism. I argue that there are significant problems with the current construal of the relationship between autism and aspects. The empirical basis for the attribution of aspect-blindness to autists is questionable. However, even if it turns out that future empirical work on autistic perception and social cognition decisively supports the attribution of some forms of aspect-blindness to autists, the descriptive and explanatory fruitfulness of the notion of aspect-blindness is limited in important ways. Exclusive focus on aspect-blindness prematurely closes off a whole host of intriguing possibilities for conceptualizing autists as engaging in aspect-*perception*. We should broaden our framework for understanding autistic experience to begin to investigate these underexplored possibilities.

The discussion proceeds as follows. First, I give overviews of aspect-perception, aspect-blindness, and autism and separate out several ways of understanding the recent appeal to the notion of “aspect-blindness” to characterize features of autistic experience. Next, I critically assess the appeal to “aspect-blindness” to understand autistic experience, focusing my critical attention on what I call “the affective impoverishment construal.” Here I argue that relevant empirical evidence on perception and social cognition in autism does not decisively support the attribution of this form of aspect-blindness to autists. Finally, I suggest that philosophers should broaden their frame for understanding autistic experience to include the notion of “aspect-perception” and briefly and tentatively explore some first steps toward doing so. I conclude with some methodological reflections for investigating autism.

Aspect-Perception

A simple example that is often treated as paradigmatic of aspect-perception is the well-known “duck-rabbit” figure.¹



It can be seen as a duck, and it can be seen as a rabbit. But it cannot be seen as both, at the same time. The two aspects “interfere with” one another: when I see the figure as a duck, the parts of the drawing on the left side of the figure are seen as a bill. When I see the figure as a rabbit, those same parts are seen as ears. If I see the figure as a duck and experience a “change of aspect,” the rabbit-aspect “lights up” and the bill “becomes” rabbit ears. Although I recognize that the drawing has not changed, once I undergo the perceptual shift, I see the drawing differently than I did before the shift.

Aspect-change experiences had while viewing ambiguous figures such as the duck-rabbit are the most well-known and well-studied in philosophy and psychology, but there are many different kinds of aspects and many different ways of experiencing them. The concept, “aspect-

¹ The duck-rabbit figure appears in Joseph Jastrow’s *Fact and Fable in Psychology* (1900). It was, Wittgenstein’s use of it, however, that has drawn considerable philosophical attention. Many contemporary discussions of aspect-perception trace back to Wittgenstein’s remarks about the duck-rabbit figure and related phenomena, as they are found in *Philosophical Investigations* (hereafter *PI*), “Philosophy of Psychology – a Fragment” (*PPF*), *Remarks on Colour* (*RC*), *Remarks on the Philosophy of Psychology* (*RPP*), and *Zettel* (*Z*). The duck-rabbit in particular appears at *PPF* §118.

perception,” picks out a motley collection of interrelated phenomena,² but there are some features of many cases of aspect-perception that might be taken as characteristic.³ Oftentimes aspect-perception requires mastery of a technique.⁴ Which requisite abilities are needed to be capable of aspect-perception of a given kind on a given occasion may differ. For example, some aspects cannot be perceived unless the perceiver makes a “conceptual connection.”⁵ Only if the perceiver knows or is interested in such-and-such and brings the knowledge or interest to bear on her experience, or makes *this* comparison (e.g., between the duck-rabbit figure she sees now and a rabbit in a favorite comic strip), can she have the relevant aspect experience. Some aspects can be “summoned up by thoughts”⁶ while others are evoked by eye movements.⁷ Some kinds of aspect-perception require imagination (e.g., seeing a triangle as hanging from its apex or as having fallen over,⁸ seeing a cloud as a hippopotamus). Other kinds of aspect-perception would seem to involve a kind of sensitivity and attunement such as sensing the solemnity of a melody (*PPF* 233).

The idea of “aspect-blindness” prompts us to explore what it would be like to lack the ability to have aspect-perception experiences. For example, the aspect-blind would not experience the perceptual shift from seeing the duck-aspect to seeing the rabbit-aspect or vice versa while viewing the duck-rabbit. That is, they would not have the experience that is expressed by saying “I *see* that it has not changed, and yet I see it differently” even though they may *know* that the duck-rabbit figure can be seen both as a duck and as a rabbit *and* they are able

² The relevant phenomena extend beyond the visual modality, to the auditory, and perhaps others (e.g., the tactile).

³ The overview of aspect-perception provided here is merely a meager sampling of the relevant concepts and phenomena. It is not intended to provide a representative, let alone exhaustive, taxonomy of the many kinds of experiences and possible experiences one might call “aspect-perception”.

⁴ *PPF* §222.

⁵ *RPP* II §510.

⁶ *RPP* I §1036.

⁷ *RPP* I §997.

⁸ *PI* §200c.

to see both aspects. We can distinguish another possible form of aspect-blindness that is not a matter of blindness to *change* of aspect but instead a matter of being unable to notice an aspect. For example, they would be unable to see a likeness between two faces or to shift from seeing meaningless lines to seeing a face in a puzzle-picture or to see a wooden crate as a dollhouse. Like blindness to change of aspect, the inability to notice an aspect is partly characterized by an experiential difference between (merely) *knowing* that an aspect is there to be seen and actually *seeing* it (i.e., seeing aspects change or noticing an aspect, depending on the kind of aspect-perception experience in question).

A note about the role Wittgenstein's thought plays in this paper. A lot of what Wittgenstein meant by "seeing an aspect," "aspect-blindness," and related concepts in his elusive and subtle discussions of aspect-perception is unclear. While very interesting, uncovering what Wittgenstein meant by these notions is for another occasion. Nothing I want to argue here depends on a rich interpretation of Wittgenstein or on Wittgenstein being right. That being said, some lines of thought in the positive proposal ("Rethinking the Application of Aspect-Perception Concepts to Autism") and the conclusion resonate with Wittgenstein's.

Autism

Having sketched initial characterizations of aspect-perception and aspect-blindness, I will now briefly introduce autism. Autism is characterized as a neuro-developmental condition and is diagnosed via behavioral criteria in the *DSM-V (Diagnostic and Statistical Manual of Mental Disorders)* entry "autism spectrum disorder" that are taken to indicate deficits: difficulties with social initiation and response (e.g., little or no eye contact, atypical gestural communication), linguistic challenges (e.g., misunderstanding pragmatic/social uses of language), and restrictive,

repetitive or stereotyped behavior, interests, or activities (e.g., spinning objects, perseverative speech, rocking back and forth).

Those diagnosed with autism can vary tremendously in behaviors and characteristics deemed relevant to diagnosis. For example, some autists make little or no eye contact while others do. Some autists do not speak or have limited speech while others develop expressive and receptive language but have difficulty using these language skills to interact socially. And some autists describe themselves as “passing”—that is, as being able to pass as “neurotypical” (e.g., through intensive training that teaches them how to behave like neurotypicals do) even though they carry an autism diagnosis and identify as autistic. Research on autism has exploded in recent decades, but there are few uncontested facts about the condition. Although we have some clues about possible environmental triggers, the biological underpinnings of autism, and gene-environment interactions and their effects on development, ultimately its causes are unknown. Not surprisingly, given the enormous behavioral and neuro-developmental variability and complexity of autism, its cognitive and behavioral phenotypes are still works in progress.

Philosophical Portrayals of Aspect-Blindness in Autism

Before I articulate various ways philosophers appeal to the notion of “aspect-blindness” to characterize autism, some preliminary observations are in order. First, it would be misguided to treat existing references to aspect-blindness in autism in the philosophical literature as anything resembling developed accounts of the relation between autism and aspect-blindness or as full-on arguments defending the claim that autists are aspect-blind. The suggestion that autists are aspect-blind is often made in passing or limited to a footnote mention (e.g., Overgaard, 2006; Bax, 2009). Given this, in what follows I will approach existing mentions as invitations for

further development and critical reflection. My first task, then, is to consider more carefully what it might mean to say that autists are aspect-blind. Second, the suggestion that autists are aspect-blind is made in contexts of discussion where the main philosophical agenda is something other than understanding autism in its own right (e.g., Overgaard, 2006; Bax, 2009; Stawarska, 2010; Proudfoot, 2013). In such contexts, autism mainly functions as a putative real-life example of aspect-blindness or as a comparison case. The primary focus of this paper, by contrast, is to improve progress in our understanding of autism itself by considering whether and how an appeal to the notions of “aspect-blindness” and “aspect-perception” can illuminate dimensions of autistic experience that call for description. Third, in the light of the prior two preliminary observations, my explorations in what is to come should be taken more as a best faith attempt to start a conversation on underexplored topics which deserve our concerted effort and sustained attention, than as a contribution to an already existing philosophical debate on the issues at hand.

So, what is it that philosophers have in mind when they claim that autists suffer from aspect-blindness? The starting idea is that autists have well-documented but poorly understood social difficulties that are somehow due to difficulties understanding others’ mental states. Then it is proposed that difficulties understanding others’ mental states can be thought of as a form of aspect-blindness. On this line of thinking, autists are unable to see a person’s narrowed eyes and downward turned mouth as an expression of anger or to hear a voice as joyful, for example. They are thereby said to be “blind” to the angry facial expression or “deaf” to the joyfulness in the voice, even though their eyesight or hearing is not defective.

Construals of aspect-blindness in autism narrowly focus on blindness to emotions expressed in human behavior, with facial expressions serving as the paradigmatic example. And yet, despite this common focus, each construal depicts what it means to be “blind” to emotional

expressions in a different way. In what follows I identify three ways it is understood. Note that these characterizations are not mutually exclusive. In fact, they overlap and intermix. I disentangle them in order to sensitize the reader to different dimensions of the idea that autists are aspect-blind.⁹

Affectively Impoverished Seeing. One construal of the aspect-blind hypothesis is framed in terms of comparisons between congenitally blind, typical, and autistic individuals. Congenitally blind people, unlike autists and typical individuals, are visually impaired but compensate for this impairment in other ways (e.g., through touch and hearing) that enable them to form and engage in social relations, albeit in unusual ways. Typically-developing individuals have intact vision and a capacity for “mindsight.”¹⁰ That is, they can see other people and even objects and events “with feeling”; their perception has an affective dimension.¹¹ For example, a teacher sees a student’s furrowed brow as a manifestation of the student’s confusion. By contrast, in autists, it is claimed, seeing is dissociated from feeling or affectively “neutralized”, and this is taken to impair their ability to see the emotional significance of people and things. This

⁹ Notice that all these construals are committed to the idea that autists are “blind” to the angry facial expression or to the joyfulness in the voice, for example, even though their eyesight and hearing are not defective. Two presuppositions underlie this claim. I note them but do not assess them here. The *first* is that (at least some) psychological phenomena can be perceived in face-to-face social encounters and that ordinarily, people do perceive such phenomena. The *second* concerns the relation between perceiving emotional expressions and aspect-perception; namely that perceiving emotional expressions is a kind of aspect-perception, and correspondingly that the inability to perceive these expressions is a form of aspect-blindness.

Both presuppositions are contentious. Regarding the first presupposition, there is much theoretical debate concerning how best to describe and explain how we come to understand others’ mental states (e.g., through inference or perception or both) and whether and how our mental attributions (e.g., “Sarah is angry,” “Bob wants more coffee”) are justified (e.g., inferentially or non-inferentially). A common line of thought in both philosophy and psychology is that to access other minds humans have to infer unobservable mental states from overt behavior, which *is* observable and thus perceptible. Recently, however, the idea that at least some of our access to other minds is perceptual has begun receiving serious consideration theoretical attention. Proponents of perceptual models claim that we can, at least in some cases, immediately perceive the mental states of other people. See Gallagher (2004) and Krueger and Overgaard (2012) for example. Regarding the second presupposition, this is an under-theorized topic, one that tends to be taken up in the context of Wittgenstein interpretation, and here interpreters disagree whether Wittgenstein holds that psychological concepts (e.g., “sadness,” “joyfulness,” “timidity”) are aspect concepts. For discussion see Mulhall (1990) and Baz (2000), who challenges Mulhall’s interpretation.

¹⁰ Stawarska (2010), p. 273.

¹¹ *Ibid.*, p. 274.

impairment is then understood as a matter of being blind to (at least some) “aspects” of human faces and behavior.

Lack of Gestalt Perception. Another way blindness to psychological aspects in autism is specified is in terms of an inability to perceive *Gestalten*.¹² That is, those with this form of aspect-blindness would be able to see the parts of another person’s face (e.g., a mouth turned upward in a particular way and cheeks lifted) but see them as meaningless, disconnected bits rather than as component parts of a meaningful, circumscribed whole or *Gestalt* (i.e., a smiling, joyful face) and can only, with difficulty, build a meaningful whole from their fragmentary perceptions of facial anatomy. By contrast, one who can see the relevant aspects immediately perceives the meaningful whole (e.g., the angry face) while the physical shapes and colors are not as readily noticed.

Soul-blindness.¹³ A third way aspect-blindness in autism is characterized is in terms of “soul-blindness.” The soul-blind see other people’s behavior (and their own) in a mechanical way—in terms of “measurable actions and reactions” (Bax, 2009, p. 73)—rather than as expressive of psychological phenomena (e.g., pain or joy). This way of seeing human behavior (their own and others’) is characterized as a form of treating others as soulless beings (e.g., like objects or automata).

I have just articulated three portrayals of what it might mean to say that autists are aspect-blind, each of which needs to be examined. Unfortunately, I cannot address all of them here. My focus in the next section is assessing the empirical backing for the first of these: the affective impoverishment construal of aspect-blindness in autism. I have chosen this focus because the

¹² See Overgaard (2006), footnote 12, p. 70, for example.

¹³ This characterization, found in Bax (2009), borrows from discussions of soul-blindness in Cavell (1979). Bax (2009) suggests that “severe” autists and sociopaths are examples of the soul-blind. Cavell (1979) does not cite autism or sociopathy as illustrations of soul-blindness, however.

affective impoverishment construal connects most readily and substantially with a central topic both in the science of social cognition in autism and in personal accounts of autism—characterizing and explaining autists’ atypical eye contact—and thus can serve as a helpful illustration of how we might go about assessing the idea that autists are aspect-blind.

Assessing the Affective Impoverishment Construal

Before assessing the affective impoverishment construal, I must acknowledge an important worry about these portrayals of autists as aspect-blind: they seem to encourage a deficit view of autism whereby one conceptualizes autists primarily (or even solely) in terms of their perceived deficiencies, dysfunctions, and limitations, and there are pressing ethical concerns about a deficit approach, particularly those that focus on supposed deficiencies in emotion, affect, and social motivation.

The affective impoverishment construal characterizes autists’ seeing as affectively “neutralized,” and “dissociated from feeling,” resulting in a “socially anesthetized view of the world.”¹⁴ Such characterizations bring to mind the dangerously misleading yet persistent “lack of empathy” portrayal of autism. Both capacities (aspect-perception and empathy) are characterized as defining marks of humanity. For example, aspect-perception is said to answer to “a fundamental aspect of the human condition,” to play a crucial role in the human “form of life,”¹⁵ and is taken to be a phenomenon that captures our (humans’) basic relation to the world.¹⁶ Characterizing aspect-perception as an expression of one’s own humanity and awareness of others’ humanity implies that those who are aspect-blind lack something fundamental to being human. For example, those blind to the psychological significance of human behavior are

¹⁴ Stawarska 2010, p. 274.

¹⁵ Baz (2000).

¹⁶ Mulhall (1990).

described as “incapable of seeing the very subjectivity or humanity of [their] fellow beings.”¹⁷ Their behavior and their understanding of others’ behavior is described as mechanical, robotic.¹⁸

Like the “lack of empathy” portrayal of autism, these ways of construing aspect-blindness in autism may perpetuate stereotypes of autists as unfeeling, uncaring, and detached. They neglect the likelihood that unusual behaviors and other atypicalities conceal autists’ interest in others and desire for human contact. And there is the accompanying danger that these kinds of deficit attributions could lead to excluding autists from certain activities or roles at school, at home, or in the workplace.

These worries warrant serious attention, but my concerns here are different. The focus of my assessment is the descriptive and explanatory fruitfulness of attributing aspect-blindness to autists for understanding autistic experience, not the ethical viability of this attribution.

As noted above, my assessment of the empirical backing for the attribution of aspect-blindness to autists will focus on the affective impoverishment construal. I argue that the empirical backing for attribution of this form of aspect-blindness is questionable at best as psychological studies on and hypotheses concerning relevant “autistic” behaviors are mixed. Furthermore, many first-person accounts of how autists experience eye contact run contrary to this construal.

To assess whether the affective impoverishment characterization of autists’ face perception is empirically sound one must investigate autists’ looking, face scanning, and eye tracking, behaviors taken to be integral to face perception in humans. Face perception is thought to play a key role in understanding others’ thoughts, feelings, and so forth. In the West, at least, it is believed that a lot of visual information about people’s feelings and thoughts is captured in

¹⁷ Bax 2009, p. 73.

¹⁸ For example, see Mulhall (1990), Bax (2009), and Proudfoot (2013).

their faces, most especially in their eyes. Many studies show that autists look at faces for less time and look at different parts of the face than non-autistic individuals (Falck-Ytter & Hofsten, 2011). In an oft-cited study (Klin, Jones, Schultz, Volkmar, & Cohen, 2002) researchers recorded autists' scanning behavior while viewing an emotional scene of the film "Who's Afraid of Virginia Wolf" and found that autists spent more time looking at the actors' mouths than at their eyes.

This is just one of many studies that have shown that autists do not look at the eyes as often, at the same time, or as long as typical individuals. In fact, these and other kinds of atypical eye contact related behaviors are well-documented across a variety of domains. They are observed in experimental, clinical, and everyday settings. The contentious issue is what these behavioral differences tell us about autists' social cognition. In this connection, the relevant question for our purposes is whether autists' looking and scanning behavior decisively supports the attribution of aspect-blindness understood as affectively impoverished seeing. That is, do these behaviors indicate that autists' face perception is somehow "emotionally anesthetized" or "affectively impoverished"?

To get some traction on this question, let's examine two prominent and competing psychological hypotheses posited to explain autists' looking and scanning behavior: the gaze indifference and gaze aversion hypotheses.

According to the gaze indifference hypothesis, autists fail to look at the eyes because, in some sense, they do not appreciate the psychological significance of the eyes. Proponents of this view describe autists as not interested in social stimuli (Grelotti, Gauthier, & Schultz, 2002) or as insensitive to social signals of others' eyes (Moriuchi, Klin, & Jones, 2017). In other words, autists tend to *ignore* the most emotionally salient region of faces because these regions are not

engaging or salient for them. This hypothesis is in keeping with a common portrayal of behaviors associated with autism: that these behaviors indicate interpersonal indifference to others (Hadjikhani, Joseph, Snyder, & Tager-Flusberg, 2017).

At first blush, the gaze indifference hypothesis would seem to align with the idea that autists' face perception is affectively impoverished. But on closer examination key characterizations of the affective impoverishment construal (e.g., failing to “see faces as infused with emotional significance,” “affectively impoverished” and “emotionally anesthetized” seeing) are ambiguous. For example, do these phrases mean that autists see faces as totally devoid of emotional significance, or that they struggle to see the particular emotional significance of others' facial expressions? On the second understanding, autists would see the emotional significance of faces, in some sense. They would see a face as manifesting some feeling or other but would struggle to accurately detect what is being expressed—for example, whether on a given occasion another person's eyes express sadness or longing. So, despite first impressions, it is unclear whether the gaze indifference hypothesis supports the affective impoverishment construal of aspect-blindness in autism.

I turn now to a competing explanation of autists' eye contact behaviors: the gaze aversion hypothesis. On this hypothesis, autists actively *avoid* eye contact and do not look at faces at the same time, as often, for as long, or at the same face regions as typical individuals because it is overwhelming, painful, or otherwise disturbing, or uncomfortable for them to do so (Hutt & Ounsted, 1966; Kliemann, Dziobek, Hatri, Steimke, & Heekeren, 2010). Eye contact avoidance is taken to indicate implicit awareness of the social significance of eye contact. Autists recognize the social significance of eye contact but have negative reactions to it that motivate them to avoid it. Recall that the gaze indifference hypothesis suggests autists exhibit interpersonal indifference

to others or a lack of socio-affective sensitivity. The gaze aversion hypothesis, by contrast, suggests that autists experience socio-affective *oversensitivity*. Thus, it would seem to directly conflict with the affective impoverishment construal.

Consistent with the gaze aversion hypothesis, autists appear to have a stronger skin conductance reaction to direct gaze (Joseph, Ehrman, McNally, & Keehn, 2008; Tanaka & Sung, 2013). Further, recent imaging work shows heightened activation of the amygdala, a part of the brain that plays a key role in processing emotions, during gaze fixation (Dalton et al., 2005; Kleinhans et al., 2010). When constrained to look in the eyes, autists show abnormally high activation in the subcortical system (Hadjikhani et al., 2017). Thus, autists may in fact have a *heightened* emotional response to direct eye contact, not an impoverished one.

All in all, results of experimental studies of autists' looking and scanning behavior are mixed. There is no scientific consensus concerning whether these behaviors demonstrate that autists have heightened or diminished socio-affective sensitivity. Moreover, there are questions concerning how to understand precisely how affectively impoverished seeing manifests in the relevant kinds of behaviors and thus how to understand the relation between the behavioral manifestations of affectively impoverished seeing and empirical work on autists' atypical socio-affective sensitivity during face perception.

In addition, many autobiographical accounts and other self-reports regarding how autists experience eye contact in social interaction suggest that autists experience socio-affective oversensitivity when engaging in direct eye contact. Some autists may experience the "overwhelming presence of another" (Cole, 1999, p. 90) when they meet another person's gaze. One autist describes the experience of direct eye contact this way: it "I actually hear you better when I am not looking at you...eye contact is...uncomfortable" (Lawson, 1998, p. 11); And

another: “I can look but it’s not pleasant” (Kedar, 2012, p. 49); And another: information falls out of the eyes onto you “like a bombardment” (Endow, 2017, n.p.); and another: “it can be a physical pain; it feels like burning with too many emotions, and I just can’t take it in all at once” (Howard, 2016, n.p.).

To conclude this section, existing empirical data from experimental psychology and personal accounts of autistic experience in social interaction do not decisively support the attribution of aspect-blindness to autists, where aspect-blindness is understood as affectively impoverished seeing.

Rethinking the Application of Aspect-Perception Concepts to Autism

Next, I explore the possibility of broadening out to include the notion of “aspect-perception” in framing some sensory-perceptual differences in autists. What might motivate theorists of autism to explore conceptualizing autists as engaging in forms of *aspect-perception* rather than primarily or exclusively framing autistic experience in terms of aspect-blindness? Perhaps most importantly, a framework that features aspect-perception takes seriously the idea that autists have a point of view on the world that is not simply a matter of missing things that those labeled “normal” perceive. Their perceptual experience is not understood as merely the absence of forms of perceptual experience individuals typically have or simply in terms of variation in quantities of features, traits, abilities, or characteristics non-autistics have. While both aspect-blindness and aspect-perception can support understanding some autistic sensory-perceptual differences in terms of *qualitative* variation—as differences in kind, not just degrees—aspect-perception allows for capturing more kinds of qualitative differences than aspect-blindness.

In addition, an emphasis on aspect-perception could help theorists develop and assess a provocative idea at the heart of the autism rights movement: that some forms of atypical neurological “wiring” in humans, such as autism, are positive variations (Blume, 1998). Proponents of the neurodiversity perspective, as it applies to autism, advance the claim that autism is an ineliminable aspect of an autistic person’s identity that should be accepted, respected and supported, even celebrated, rather than eliminated.¹⁹ Framing some of autists’ sensory-perceptual differences in terms of alternate forms of aspect-perception could give us a way to conceptualize some of those differences as fundamental, ineliminable ways of being in the world, ways that, at least in *some* cases, confer aesthetic, epistemic, pragmatic advantages and benefits and are thus, in that sense, positive.

Sensory-Perceptual Differences Associated with Autism

Autists’ neurodiversity manifests in the wide range of sensory, movement, perceptual, and cognitive differences documented through self-report and research studies. These differences are multifarious and often idiosyncratic. Sensory-perceptual features, in particular, illustrate the diverse range of phenomena: they are evidenced across modalities (auditory, visual, somatosensory, gustatory, olfactory, and vestibular) (Baranek, Little, Parham, Ausderau, & Sabatos-DeVito, 2014) and occur in some forms and to some extent in most autists regardless of intellectual ability (Leekam, Nieto, Libby, Wing, & Gould, 2007).

In a moment I will briefly describe some of the reported sensory-perceptual differences documented in autism that are all but unexplored by philosophers who link autism and aspect-

¹⁹ Importantly, to embrace the neurodiversity perspective is not to embrace the view that all facets of being autistic are positive. Proponents of neurodiversity grant that some facets of autism are experienced as impairing by some autists in some physical and social environments, and that remediation of these aspects and/or social change are desirable responses in such cases.

perception (or rather aspect-blindness). My aim here is modest: to begin to investigate whether these sensory-perceptual features can be fruitfully described as forms of aspect-perception or as requisite capacities for forms of aspect-perception primarily by identifying questions about these phenomena and their interrelations that it would be good to have answers to if the broad, guiding question is how to understand the relations between autism, aspect-perception, and aspect-blindness. Before I begin, a few cautions are in order. First, I am not claiming all and only autists experience these kinds of differences. Second, the impact of these differences on autists' development and everyday social functioning are not well understood.

Sensory Sensitivities. Many autists experience either increased (hyper-) or decreased (hypo-) sensitivity to incoming stimuli. These sensitivities can vary from hypo- to hyper-sensitivity even within the same individual (Baranek et al., 2014) and may result in reacting differently to the same stimuli. Many autists can experience particular sounds, food smells, tastes, or clothing textures as intensely painful or pleasurable. One autist recalls a childhood memory of the pain and anxiety he experienced from a hyper-sensitivity to certain sounds: "My mom took me through a drive-thru carwash once when I was in grade school and I was terrified. The brushes sounded to me like the sound of intense machine gunfire, but I could not communicate well enough to explain why I got so upset" (Quoted in Robledo, Donnellan, & Strandt-Conroy, 2012, p. 4).

What I want to underscore here is that autists' hyper-sensitivities may enable an enhanced ability to perceive sensory stimuli, an ability that may be requisite for some forms of aspect-perception. Moreover, some of these hyper-sensitivities constitute or contribute to forms of talent when they confer epistemic, aesthetic, or pragmatic advantages. In the auditory domain, for example, some autists have superior pitch recognition, better discrimination of musical tones,

or enhanced perception of specific frequencies of sounds that are not easily discernible by others (Bonnell et al., 2003; Heaton, Davis, & Happé, 2008).

Hyper-sensitivities in the auditory and visual modalities that confer epistemic, aesthetic, or pragmatic advantages are perhaps the most common. In *Look Me in the Eye* (2007), autistic autobiographer John Elder Robison provides a vivid example of increased sensitivity in the tactile modality. He describes the pragmatic benefits of his hyper-sensitive touch for bike repair:

... [It] allowed me to sense the condition of mechanical things through my hands. And the more I practiced, the better my ability to sense machinery became.

As I turned the pedals on an old bike I'd feel tiny bumps as grains of sand passed through the gears...I'd feel little grabs as I pedaled through tight spots, where the chain might not be properly oiled. I could even feel sloppiness when the crank bearings were too loose. I learned to feel every moving part of the bicycle with just a few simple touches. (p. 233)

The language Robison uses here is suggestive of aspect-perception. He describes his experience in terms sensing machinery and the condition of mechanical things and feeling sloppiness through touch.

Perceptual Processing in Autism. In addition to differences in sensory sensitivity that may enhance their ability to perceive sensory stimuli, autists appear to have differences in perceptual processing, and these differences afford autists advantages when performing some perceptual tasks. Many research studies have demonstrated that autists' performance in some perceptual domains is superior to comparison groups, especially when the perceptual task requires attention to minor changes in an environment, details, parts, specific features, and local information. Autists are superior at picking out individual features from some larger entity. For

example, autists consistently perform at a level superior to non-autists on visual search (Joseph, Keehn, Connolly, Wolfe, & Horowitz, 2009), the Block Design test (Shah & Frith, 1993), and Embedded Figures tasks (Motttron, Dawson, Soulières, Hubert, & Burack, 2006). Autists can complete jigsaw puzzles just as easily with the picture facedown as when it is face-up (Frith & Hermelin, 1969). Some studies suggest that they are less susceptible to some kinds of visual illusions (Happé, 1996). Autists' superior performance on these tasks is thought to be due to enhanced local processing. While typical individuals focus on global information by default, autists appear to focus on local information by default and do not automatically attend to the "gist" of what they perceive.

What bearing might these empirical data have on our understanding of whether and how the notions "aspect-blindness" or "aspect-perception" can be fruitfully applied to describe atypicalities in autists' perceptual experiences in this domain? Are there conceptual grounds for describing autists' enhanced perception of specific parts and fine details in these settings as a form of alternate aspect-perception?

One consideration in favor of an affirmative answer is that autistic and non-autistic perceivers view the same figures and diagrams under the same conditions and yet have different visual experiences of those diagrams and figures. As with cases of disparities in aspect-seeing across typical individuals, we might say that in one sense, what autistic and non-autistic participants see in these cases is the same (after all they are viewing the same stimuli), but in another sense of "what is seen," what autists and non-autists see is not the same. Yet questions remain regarding how to characterize the relevant experiential disparities. Autists appear to be less likely to see the details as interrelated parts of a comprehensive whole or *Gestalt*. Are autists thereby *Gestalt*-blind? While autists may not *spontaneously* and automatically attend to the

“gist” of the diagram or figure as readily as typical individuals, interestingly and importantly, research suggests they are capable of global processing and to attending the “gist” when *prompted* (Koldewyn, Jiang, Weigelt, & Kanwisher, 2013). Given these empirical results, we should not automatically conclude that autists have a weakness in global processing and are thereby unable to attend to the *Gestalt* as a byproduct of their enhanced local processing. Moreover, whether autists exhibit a local processing bias would seem to depend on the nature of the stimuli and task. There is no simple equation between “autistic” and “local processor” (D’Souza, Booth, Connolly, Happé, & Karmiloff-Smith, 2016).

However we decide to conceptualize autists’ atypicalities in these domains, our ways of framing them should be sensitive to potential differences between (i) a lack or incapacity in x and (ii) a preference or style for y such that x is not the perceiver’s spontaneous, automatic, or default way of perceiving. Moreover, these empirical data raise intriguing questions about the possible role and significance of spontaneity in aspect-perception experience. If a perceiver is less inclined to spontaneously see the picture as a comprehensive whole or to undergo perceptual reversals when viewing ambiguous figures such as the duck-rabbit, is this a form of incapacity? Is needing to be prompted to see the *Gestalt* or to change aspects a form of incapacity? If it is a form of incapacity, is this incapacity fruitfully conceptualized as a form of *aspect-blindness*?

Synesthesia. A third kind of atypical sensory-perceptual phenomenon documented in autists is synesthetic experiences or synesthesia-like experiences. Synesthesia occurs when the stimulation of one sensory modality (inducer) triggers a response in either a second modality or a different facet of the same modality (concurrent). It can be conceptualized as the occurrence of a conscious perceptual experience in the absence of the normal sensory stimulation (Ward, 2013). So-called colored hearing, visual experiences of colors triggered by hearing musical notes

(Baron-Cohen, Wyke, & Binnie, 1987), and particular tastes triggered by hearing or reading certain words (Ward & Simner, 2003) illustrate multi-modal synesthesia. Music can have colors, words can have taste, and tastes can have shapes. For example, a man with taste-shape synesthesia cooking chicken remarks, “I wanted the taste of this chicken to be a pointed shape, but it came out all round” (Cytowic & Wood, 1993, p. 4). Visual experiences of colors triggered by visually perceiving black text or digits illustrates uni-modal synesthesia. For example, seeing the numeral five as blue.

The prevalence of synesthesia in autists is thought to be higher than in the general population. For example, a recent study (Baron-Cohen et al., 2013) of the prevalence of grapheme-color synesthesia (viewing numbers or letters triggers experiences of colors) in autists suggests that synesthesia is significantly more common in autistic adults than in typical adults, at a rate three times greater (18.9%) than in the typical sample (7.22%) based on self-report.

Autists appear to experience not only common forms of synesthesia like grapheme-color synesthesia but also less prevalent forms. For example, Jim, an autistic adult, experiences a mixing of touch and sound. Jim reports that “[t]ouching the lower part of his face produces a sound-like sensation in addition to the tactile sensation” (Cesaroni & Garber, 1991, p. 305). FC, a savant autistic adult, experiences a kind of month or number/emotion correspondence that combines emotion and physical sensation. In a case study (Bouvet et al., 2014) FC reports that some numbers can be “nice or not nice” or that numbers can “matter or not matter” (n.p.). The researchers reported that “the evocation (or the vision) of certain numbers cause FC a physical sensation, as sometimes he reacted to certain numbers as though to a tickle” (n.p.). FC also refers to months of the year to verbalize his emotions and sensations.

These phenomena cast doubt on the claim that autists have affectively impoverished perception since many kinds of synesthetic experience may have an affective dimension. But how, if at all, are these experiences related, conceptually or otherwise, to aspect-perception? To get traction on this question we need to improve our understanding of the interrelations between sensory hyper-sensitivities, extra attention to detail, and synesthesia. Are autists' sensory hyper-sensitivities a basis for their extra attention to detail?²⁰ Are these sensitivities a basis for their synesthetic experiences? More generally, in what sense, if any, do extra attention to detail, sensory hyper-sensitivity, and synesthesia facilitate some forms of aspect-perception? Are hyper-sensitivity and extra attention to detail requisite for some forms of aspect-perception?

Aspect-Perception in the Psychological Domain? In this exploration of autists' sensory-perceptual differences I have been suggesting that there is a need for more careful and thoroughgoing reflection on how to characterize those differences in ways that allow for perceptual presence, not just absence, and in ways that capture the diversity and complexity of differences between autistic and typical individuals. This, I think, is also apparent in the psychological domain, in the ways autists achieve interpersonal understanding, the very domain that is cited by philosophers as one in which autists are aspect-blind.

Consider, for example, how Donna Williams, an autistic adult, describes her perception of mood:

I could tell mood from a foot better than from a face. I could sense the slightest change in regular pace and intensity of movement of foot. I could sense any asymmetry in rhythm that indicated erraticness and unpredictability...Facial expression, by comparison, was so overlaid with stored expression, full of so many attempts to cover up or sway

²⁰ See Baron-Cohen, Ashwin, Ashwin, Tavassoli, & Chakrabarti (2009) for discussion of potential links between hyper-systemizing, hyper-attention to detail, and sensory hyper-sensitivities in autism.

impression²¹ that the foot was much truer. I used sound in the same way, even breathing. Intonation aside, I could sense change in regular rhythm, pace, intensity and pitch.

(quoted in Cole 1999, p. 96)

Here we have the description of a less ocular-, face-, and head-centric way of achieving understanding of a person's mood through perceiving non-verbal behavior than more typical methods (e.g., seeing emotions in facial expressions). But Williams' report is not a description of a point of view that is simply missing things typical individuals perceive. Nor is it a description merely of lack or exaggeration of what typical people do. What sense-modalities Williams relies on most, what aspects of expressive behavior she orients to and attends to, differ in kind. Williams reports sensing the tempo and rhythm of breath, voice, and foot movement, qualities of kinesthetic behavior, as expressive of a person's mood.

Like typical individuals, Williams describes her experience in this face-to-face encounter as one where she perceives mental states in expressive behavior, the perceiving of psychological aspects, if you will. But the kinds of non-verbal, expressive behavior that are most infused with meaning for her are not the ones that are commonly the focus of perceiving the mental in expressive behavior.

Compare Williams' description of coming to understand another's mood through non-verbal behavior with Daniel Tammet's (2006), another autistic adult's personal account of understanding others:

Numbers are my first language, one I often think and feel in. Emotions can be hard for me to understand or know how to react to, so I often use numbers to help me. If a friend says they feel sad or depressed, I picture myself sitting in the dark hollowness of number

²¹ In her best-selling memoir, *Nobody Nowhere* (1992), Williams further describes how she was overwhelmed by perceiving faces.

6 to help me experience the same sort of feeling and understand it...By doing this, numbers actually help me get closer to understanding other people. (p. 7)

While Williams uses non-verbal cues during in-person encounters to help her understand others' moods, Tammet uses his first language, numbers, to simulate, in his imagination, the feeling-in-context that he wishes to understand. For many, numbers connote the impersonal, yet for Tammet numbers could not be more personal, more imbued with feeling. He has an idiosyncratic form of imaginative simulation that involves number-emotion synesthesia as a basis for empathetic identification with those whose feelings he wishes to understand, but it is unclear whether those whose mental states Tammet understands through this technique are or need to be perceptually present, and this gives us reason to refrain from conceptualizing the technique as a form of aspect-perception, although perhaps it is or could be a requisite ability for aspect-perception in face-to-face social encounters.

My third example involves understanding non-human animals. Temple Grandin (1995), an autistic adult, noticed aspects in cattle behavior that others did not, which helped her to design more humane slaughterhouses. She believes that her autism results in heightened sensory perceptions that allow her to imagine how an animal will feel moving through a system. Here she describes some of her observations of cattle behavior and how they improved her slaughterhouse designs:

It is the little things that make them balk and refuse to move, such as seeing a small piece of chain hanging down from an alley fence...Cattle will also balk and refuse to walk through an alley if they can see people up ahead...This is one of the reasons that I designed curved single-file alleys with solid sides. They help keep cattle calmer... (pp. 142-149)

It is clear from our examples in this section that many autists experience their sensory-perceptual atypicalities as conferring various kinds of advantages. Yet, as Jim Sinclair (1998), another autistic adult with synesthesia and sensory hyper-sensitivity, notes there can be a kind of trade-off between the advantages and disadvantages of such atypicalities. While tinted lenses improve the functional use of Sinclair's vision for some tasks, it is at the expense of what he characterizes as "meaning in perception." Sinclair writes:

[S]ensory sensitivities can be painful and can prevent enjoyment of some aspects of normal social involvement—but I gain so much beauty and meaning from the way my senses work! My hearing is oversensitive and this is bothersome at times, but I wouldn't change it because I don't want to lose the colors of voices and the tactility of music. (n.p.)

Let's take stock. Am I claiming that aspect-perception should be the main methodology for investigating sensory-perceptual differences associated with autism? On the contrary. I want to leave it open that the aspect-blindness hypothesis may capture something important about autists' sensory-perceptual experience, but we need to rethink how we are pursuing this hypothesis given the empirical and conceptual issues I draw attention to in problematizing the notion of "aspect-blindness" as applied to autism. And I am suggesting that if we are going in this direction, thinking about connecting autism and aspects, it is at the very least plausible, even promising, to explore aspect-perception in understanding autism, and as such it would be better to include aspect-perception in a descriptive and explanatory framework for understanding autism that appeals to aspect concepts. Whether "aspect-perception" applies to all or some subset of sensory-perceptual differences associated with autism is something that we need to explore. How far a framework for understanding autism that includes aspect-perception will take us we

do not know yet, but we should pursue this, all the while keeping in mind the empirical and conceptual issues about aspect-blindness and aspect-perception.

Conclusion

In conclusion, a focus on perception is a welcome development in autism studies, and autism studies and the neurodiversity movement would benefit greatly from a deeper understanding of the phenomena of aspect-perception. However, I want to stress, we must proceed cautiously, both with the notion of “aspect-blindness” and with the notion of “aspect-perception.” One key reason for caution concerns the nature of aspect-perception: it allows for experiential disparities between perceivers without any corresponding differences in sensory input. That is, it is possible for multiple perceivers viewing the same object at a given time under the same viewing conditions to perceive that object under different aspects at that time, or for one perceiver to notice an aspect that goes unnoticed by the other perceiver. For example, both perceivers see the two faces, but only one perceiver notices the likeness between the two faces. The failure to see the likeness is not explicable in terms of defective or compromised sight. And yet aspect-perception is a genuinely perceptual experience. An epistemic consequence of this feature of aspect-perception and autists’ fundamental unlike-mindedness is that autists may perceive aspects non-autists do not and even cannot perceive. And if non-autists cannot perceive these aspects themselves, it raises the question of whether non-autists can perceive autists’ perceiving them.

Thus, we should keep continually aware of the possibility of our own blindness when we investigate autism. Having the thought, “I could be blind too,” more in the front of our minds might help us understand some features of autism that we could not otherwise understand. Such

methodological humility constitutes an awareness of and openness to the likelihood that we might be missing something, in part because autistic differences make for unfamiliar variability in their forms of expressiveness and sensory-perceptual experience. We must learn to be open to these modes of expression and appreciate that faithfully depicting atypical experience depends on this kind of openness and learning.

In this connection, cultivating our imaginative capacities is crucial. Wittgenstein writes that we tend to imagine “the feeble-minded (*Den Schwachsinnigen*) under the aspect of the degenerate, the essentially incomplete, as it were in tatters. And so under that of disorder instead of a more primitive order” but suggests that imagining them under the aspect of a more primitive order “would be a far more fruitful way of looking at them” (Z §372). Related sentiments can be gleaned from some of Wittgenstein’s reflections on color-blind people: “We speak of ‘colour-blindness’ and call it a *defect*. But there could easily be several differing abilities, none of which is clearly inferior to the others” (RC §31) and “not every deviation from the norm must be a blindness, a defect” (RC §9).

“Feeble-minded” and related terms are deeply problematic, and we should be wary of characterizing the mentally atypical as somehow more primitive than the mentally typical. However, Wittgenstein’s suggestion—that it would be more fruitful to imagine some forms of unlike-mindedness under the aspect of an alternate order rather than a disorder—should be heeded. Wittgenstein’s observations on the notion of “defect” here also align with the idea that modeling our understanding of autists’ sensory-perceptual experience on “normal” perceptual experience can only go so far toward capturing the content and character of autists’ perceptual experience of people, objects, environments, interactions, situations, and so forth. Some sensory-perceptual experiences autists undergo by virtue of their differences are better conceptualized as

forms in their own right, with their own qualitatively distinctive phenomenology, rather than merely as quantitatively degenerate forms of aspect-perception in non-autists.

All in all, a satisfactory account of autism, one that understands autists' ways of being and sensory-perceptual experience from within their worlds, is going to require studying personal accounts of autism, careful thinking, wisdom, and perhaps most importantly, *imagination*. Imagination is only one of the tools needed, but it is a crucial resource for improving understanding of kinds of differences that are unfamiliar and remote from one's own experience. Two central tasks for future work on this dimension of the project are (i) to identify the different kinds and roles of imagination for improving progress in our understanding of autism; (ii) to identify how non-autists should cultivate their imaginative capacities in the light of (i). Regarding (i), one role for imagination is that it can encourage forms of openness and sensitivity to difference that facilitate learning about autists' modes of expression and sensory-experience, which have unfamiliar variability. As for (ii), personal accounts of autism can help non-autists cultivate their emotional responses to and ways of conceiving of autists. Narratives, in particular, are important for understanding differences remote from one's own experience. They expose us to kinds of differences we seek to understand and provide appropriate background for contextualizing those differences and embedding them in relevant contexts (Gallagher 2014). More radically, as Hacking (2009) argues, it may be that autism narratives create ways to express experiences. If this is right, then "[a]utism narratives are not just stories or histories, describing a given reality. They are creating the language in which to describe the experience of autism, and hence helping to forge the concepts in which to think autism" (p. 1).

References

- Baranek, G. T., Little, L. M., Parham, D., Ausderau, K. K., & Sabatos-DeVito, M. G. (2014). Sensory Features in Autism Spectrum Disorders. In F. Volkmar, R. Paul, K. Pelphrey, & S. Rogers (Eds.), *Handbook of Autism and Pervasive Developmental Disorders* (4th ed.). (pp. 378-408). Hoboken, NJ: Wiley.
- Bax, C. (2009). *Subjectivity After Wittgenstein*. Amsterdam: Institute for Logic, Language, and Computation.
- Baz, A. (2000). What's the Point of Seeing Aspects? *Philosophical Investigations*, 23, 97-121.
- Baron-Cohen, S., Ashwin, E., Ashwin, C., Tavassoli, T., & Chakrabarti, B. (2009). Talent in autism: hyper-systemizing, hyper-attention to detail and sensory hypersensitivity. *Phil. Trans. R. Soc. B*, 364, 1377-1383.
- Baron-Cohen, S., Johnson, D., Asher, J., Wheelwright, S., Fisher, S., Gregersen, P., & Allison, C. (2013). Is synaesthesia more common in autism? *Molecular Autism*, 4, 1-6.
- Baron-Cohen, B., Wyke, M., & Binnie, C. (1987). Hearing Words and Seeing Colours: An Experimental Investigation of a Case of Synaesthesia. *Perception*, 16, 761-767.
- Blume, H. (1998, September). Neurodiversity. Retrieved from <https://www.theatlantic.com/magazine/archive/1998/09/neurodiversity/305909/>
- Bonnell A., Mottron L., Peretz I., Trudel M., Gallun E., & Bonnell A.-M. (2003). Enhanced pitch sensitivity in individuals with autism: a signal detection analysis. *Journal of Cognitive Neuroscience*, 15, 226-235.
- Bouvet, L., Donnadieu, S., Valdois S., Caron, C., Dawson, M., & Mottron, L. (2014). Veridical mapping in savant abilities, absolute pitch, and synesthesia: an autism case study. *Frontiers in Psychology*, 5, <https://doi.org/10.3389/fpsyg.2014.00106>.
- Cesaroni, L., & Garber, M. (1991). Exploring the Experience of Autism Through Firsthand Accounts. *Journal of Autism and Developmental Disorders*, 21, 303-313.
- Cole, J. (1999). *About Face*. Cambridge, Massachusetts: MIT Press.
- Cytowic, R., & Wood, F. (1993). *The Man Who Tasted Shapes*. New York: Putnam.
- Dalton, K., Nacewicz, B., Johnstone, T., Schaefer, H., Gernsbacher, M., Goldsmith, H., Alexander, A., Davidson, A. (2005). Gaze Fixation and the Neural Circuitry of Face Processing in Autism. *Nature Neuroscience*, 8, 519-526.

- D'Souza, D., Booth, R., Connolly, M., Happé, F., & Karmiloff-Smith, A. (2016). Rethinking the concepts of 'local or global processors': evidence from Williams syndrome, Down syndrome, and Autism Spectrum Disorders. *Developmental Science*, *19*, 452-468.
- Endow, J. (2017). Spectrum: A Story of the Mind. Retrieved from <http://www.pbs.org/education/blog/spectrum-a-story-of-the-mind>
- Falck-Ytter T., & von Hofsten C. (2011). "How special is social looking in ASD: A review." *Progress in Brain Research*, *189*, 209–222.
- Frith, U., & Hermelin, B. (1969). The Role of Visual and Motor Cues in Normal, Subnormal, and Autistic Children. *Journal of Child Psychology and Psychiatry*, *10*, 153-63.
- Gallagher, S. (2004). Understanding Interpersonal Problems in Autism: Interaction Theory as An Alternative to Theory of Mind. *Philosophy, Psychiatry, & Psychology*, *11*, 199-217.
- Gallagher, S. (2014). An Education in Narratives. *Educational Philosophy and Theory*, *46*(6), 600-609.
- Grandin, T. (1995). *Thinking in pictures*. New York: Doubleday.
- Grelotti, D., Gauthier, I., & Schultz, R. (2002). Social interest and the development of cortical face specialization: What autism teaches us about face processing. *Developmental Psychobiology*, *40*, 213-25.
- Hacking, I. (2009). Autistic Autobiography. *Philosophical Transactions of the Royal Society, Biological Sciences*, *364*, 1467–73.
- Hadjikhani, N., Joseph, R., Snyder, J., & Tager-Flusberg, H. (2017). Abnormal activation of the social brain during face perception in autism. *Human Brain Mapping*, *28*, 441-449.
- Happé, F.G. (1996). Studying weak central coherence at low levels: children with autism do not succumb to visual illusions. A research note. *Journal of Child Psychology and Psychiatry*, *37*, 873–877.
- Heaton P., Davis R.E., & Happé F.G. (2008). Research note: exceptional absolute pitch perception for spoken words in an able adult with autism. *Neuropsychologia*, *46*, 2095–2098.
- Howard, R. (2016). 16 People with Autism Describe Why Eye Contact Can Be Difficult. Retrieved from <https://themighty.com/2016/02/why-eye-contact-can-be-difficult-for-people-with-autism/>
- Hutt, C., & Ounsted, C. (1966). The biological significance of gaze aversion with particular reference to the syndrome of infantile autism. *Systems Research and Behavioral Science*, *11*, 346-356.

- Jastrow, J. (1900). *Fact and Fable in Psychology*. Boston and New York: Houghton, Mifflin and Company.
- Joseph R.M., Ehrman K., McNally, R., & Keehn, B. (2008). Affective response to eye contact and face recognition ability in children with ASD. *Journal of the International Neuropsychological Society*, *14*, 947–955.
- Joseph, R. M., Keehn, B., Connolly, C., Wolfe, J. M., & Horowitz, T. S. (2009). Why is visual search superior in autism spectrum disorder? *Developmental Science*, *12*, 1083–1096.
- Kedar, I. (2012). *Ido in Autismland: Climbing out of Autism's Silent Prison*. Washington, DC: Sharon Kedar.
- Kliemann, D., Dziobek, I., Hatri, A., Steimke, R., & Heekeren, H. (2010). Atypical Reflexive Gaze Patterns on Emotional Faces in Autism Spectrum Disorders. *Journal of Neuroscience*, *30*, 12281-12287.
- Kleinhans, N. Richards, T., Weaver, K., Johnson, LC, Greenson, J., Dawson, G., & Aylward, E. (2010). Association between amygdala response to emotional faces and social anxiety in autism spectrum disorders. *Neuropsychologia*, *48*, 3665–3670.
- Klin, A., Jones, W., Schultz, R., Volkmar, F., & Cohen, D. (2002). Visual Fixation Patterns During Viewing of Naturalistic Social Situations as Predictors of Social Competence in Individuals with Autism. *Archives of General Psychiatry*, *59*, 809-816.
- Koldewyn, K., Jiang, Y.J., Weigelt, S., & Kanwisher, N. (2013). Global/Local Processing in Autism: Not a Disability, but a Disinclination. *Journal of Autism and Developmental Disorders*, *43*, 2329-2340.
- Krueger, J., & Overgaard, S. (2012). Seeing subjectivity: defending a perceptual account of other minds. *ProtoSociology*, *47*, 239–262.
- Lawson, W. (1998) *Life Behind Glass: A Personal Account of Autism Spectrum Disorder*. Lismore, Australia: Southern Cross University Press.
- Leekam, S. R., Nieto, C., Libby, S. J., Wing, L., & Gould, J. (2007). Describing the sensory abnormalities of children and adults with autism. *Journal of Autism and Developmental Disorders*, *37*, 894–910.
- Mottron, L., Dawson, M., Soulières I., Hubert, B., & Burack, J. (2006). Enhanced Perceptual Functioning in Autism: An Update, and Eight Principles of Perception. *Journal of Autism and Developmental Disorders*, *36*, 27-43.
- Moriuchi, J. M., Klin, A., & Jones, W. (2017). Mechanisms of diminished attention to eyes in autism. *American Journal of Psychiatry*, *174*, 26-35.

- Mulhall, S. (1990). *On Being in the World: Wittgenstein and Heidegger on Seeing Aspects*. London: Routledge.
- Overgaard, S. (2006). The Problem of Other Minds: Wittgenstein's Phenomenological Perspective. *Phenomenology and the Cognitive Sciences*, 5, 53-73.
- Proudfoot, D. (2013). Can a Robot Smile? Wittgenstein on Facial Expression. In T. P. Racine & K. Slaney (Eds.), *A Wittgensteinian Perspective on the Use of Conceptual Analysis in Psychology*. (pp. 172-194). New York: Palgrave Macmillan.
- Robison, J. E. (2007). *Look me in the eye: My life with Asperger's*. New York: Random House.
- Robledo, J. Donnellan, A., & Strandt-Conroy, K. (2012). An exploration of sensory and movement differences from the perspective of individuals with autism. *Frontiers in Integrative Neuroscience*, 6, <https://doi.org/10.3389/fnint.2012.00107>
- Shah, A., & Frith, U. (1993). Why do autistic individuals show superior performance on the block design task? *Journal of Child Psychology and Psychiatry*, 34, 1351–1364.
- Sinclair, J. (1998). Is Cure a Goal? Retrieved from <http://autismmythbusters.com/general-public/home/cure/is-cure-a-goal-jim-sinclair/>
- Stawarska, B. (2010). Mutual Gaze and Intersubjectivity. In S. Gallagher & D. Schmicking (Eds.), *Handbook of Phenomenology and Cognitive Science*. (pp. 269-282). Dordrecht: Springer.
- Tammet, D. 2006. *Born on a Blue Day: Inside the Extraordinary Mind of an Autistic Savant*. New York: Free Press.
- Tanaka, J.W., & Sung, A. (2013). The “Eye Avoidance” Hypothesis of Autism Face Processing. *Journal of Autism and Developmental Disorders*, 46, 1538-1552.
- Ward, J. (2013). Synesthesia. *Annu.Rev.Psychol.* 64, 49–75.
- Ward, J., & Simner, J. (2003). Lexical-gustatory synaesthesia: linguistic and conceptual factors. *Cognition*, 89, 237-261.
- Williams, D (1992). *Nobody Nowhere*. London: Doubleday.
- Wittgenstein, L. (1967). *Zettel*. (G. E. M. Anscombe, Trans.). Berkeley: University of California Press.
- Wittgenstein, L. (1980a). *Remarks on Colour*. (G.E.M. Anscombe, Ed., L.L. McAlister & M. Schättle, Trans.). Oxford, Blackwell. (Originally published in 1977).
- Wittgenstein, L. (1980b). *Remarks on the Philosophy of Psychology, Vol. I*. (G. E. M.

Anscombe, Trans.). Oxford: Blackwell.

Wittgenstein, L. (1980c). *Remarks on the Philosophy of Psychology, Vol. II*. (C. G. Luckhardt & M. A. E. Aue, Trans.). Oxford: Blackwell.

Wittgenstein, L. (2009a). *Philosophical Investigations* (4th ed.). (G. E. M. Anscombe, P. M. S. Hacker & J. Schulte, Trans.). Oxford: Wiley-Blackwell. (Originally published in 1953)

Wittgenstein, L. (2009b). "Philosophy of Psychology – a Fragment." In P. M. S. Hacker & J. Schulte (Eds.), *Philosophical Investigations*. (G. E. M. Anscombe, P. M. S. Hacker, & J. Schulte, Trans.). (4th ed.). Oxford: Wiley-Blackwell, pp. 182–243. (Originally published in 1953)