The Encultured Brain

An Introduction to Neuroanthropology

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11 Autism as a Case for Neuroanthropology: Delineating the Role of Theory of Mind in Religious Development

Rachel S. Brezis

One of the central concerns of psychological anthropology since its inception has been to determine how individual beings, with particular neuropsychological foundations, become cultural beings (Sapir, 2002; Hallowell, 1955; Shweder & LeVine, 1984). To address this question, most psychological anthropologists have examined the psychological differences between individuals of different cultures. This chapter will present a different approach—one that looks not just at cultural diversity, but at the neurological diversity underlying every interaction between individuals and culture. Specifically, we will look at the ways in which individuals with autism, equipped with a particular neuropsychological foundation, interpret and interact with one aspect of their cultural surroundings, viz., religious practice and belief.

Autism is a neurodevelopmental condition characterized by impairments in social interaction, language, and communication, and a tendency for routinized behaviors. As a condition that fundamentally disrupts the juncture between self and others, or self and culture, autism provides a unique lens onto the process of acculturation. Just as Jakobson (1971) used the study of linguistic aphasia to advance our understanding of normal linguistic functioning, autism may serve as a lens through which to view a certain “cultural aphasia.” To use a different metaphor, because of the unique pattern of abilities and disabilities associated with autism, the condition may be seen as a refractive prism through which the white light of culture is broken down into its myriad color components. While persons with autism are exposed to the same cultural input as us all, they may appropriate certain aspects of culture more intensely than others, giving them new meanings and uses, thus helping us to discern the various components of acculturation that are normally orchestrated so smoothly we cannot tease them apart.
Of all aspects of culture, the degree of religious understanding among autistic persons provides an especially pertinent case study for acculturation, as several theories of religious development argue that religious belief emerges from a foundation of interpersonal understanding (Fowler, 1981; Hay & Nye, 2006). More specifically, Bering (2002) suggests that our ability to understand others’ thoughts and intentions (theory of mind) lies at the basis of our ability to understand intentionality writ-large; and that lacking a theory of mind, autistic individuals would express an impersonal, mechanistic understanding of the universe.

Seeking the psychological foundations for religion, most researchers have compared the variety of religious practices across different religions, among experts or full lay practitioners (James, 2004; Whitehouse & McCauley, 2005). Instead, the present chapter aims to delineate the extent of religious belief in a population where researchers have predicted its absence. Given autistic persons’ difficulty in inferring others’ thoughts, would they be capable of conceiving of the world as directed by a spiritual agent? To answer this question, I conducted in-depth interviews and participant-observations in Bar Mitzvah ceremonies of Jewish children and adolescents with high-functioning autism in Israel. In brief, my respondents largely contradicted Bering’s predictions, demonstrating belief in an agentive God who gives meaning to events in the world. These surprising results led me to a reevaluation of Bering’s hypothesis, and, drawing from emerging neuropsychological studies of self-understanding in autism, suggested a renewed focus on how deficits in self-understanding in autism are conducive to religious development.

Thus, rather than impeding autistic persons from accessing certain cultural elements, their neuropsychological constraints pushed some of them to appropriate and adapt those cultural elements to further their own self-development. As a model for future neuroanthropological research on the neural bases of acculturation, the present research demonstrates the ways in which an ethnographic study of autism can provide a test for theories of religious development, illuminate the study of autism from new perspectives, and at the same time generate new hypotheses regarding the neuropsychological foundations of culture.

What is Autism? Outline of a Prism for Neuroanthropology

Autism is a neurodevelopmental condition characterized by a spectrum of impairments; autistic individuals demonstrate a wide range of functioning, ranging from profoundly retarded to highly intelligent. The diagnostic
criteria for autism include: (1) impairment in social interaction; (2) impairment in language and communication; and (3) a tendency for routinized, stereotyped behavior and interests, and a related lack of varied, spontaneous make-believe play (American Psychiatric Association, 2000). My research focused on individuals with high-functioning autism and Asperger's syndrome, who have spared language abilities and normal to above-normal intelligence, alongside their social and communicative difficulties (Kasari & Rotheram-Fuller, 2005).

While the etiology of autism is disputed, twin and family studies in the past thirty years have confirmed that autism is highly heritable (with estimates as high as 64%; see Abrahams & Geschwind, 2008, for a review), though the precise genetic basis for these heterogeneous conditions has yet to be determined (Bauman & Kemper, 2005). On a neurobiological level, converging evidence suggests that autism involves abnormalities in the cerebellum, the superior temporal sulcus, the medial temporal lobe (including the amygdala), and the frontal lobe (Penn, 2006). Though many attempts have been made to trace the complex behavioral manifestations of autism to particular brain regions, recent anatomical and functional imaging studies are pointing to an overarching deficit in brain connectivity (Muller, 2007), meaning that the behavioral deficits in autism may not emerge from abnormalities in particular brain regions, but rather, from decreased connectivity between them.

On a psychological level, the great diversity of abilities and disabilities which characterize the autism-spectrum conditions has been tied by researchers to several different core, underlying processes. One of the dominant paradigms in autism research claims that the core impairment in autism is in theory of mind, or the ability to infer others' thoughts and intentions (Baron-Cohen, Tager-Flusberg, & Cohen, 2000). Without theory of mind, autistic persons may lack the ability to detect emotion in others, engage in joint attention, and further develop language and other social skills. Bering (2002) relies on this paradigm to predict that persons with autism would not search for an intentional agent to give meaning to events in the world.

Another explanatory core for autism is a cognitive style that prioritizes details over gestalt perception, resulting in "weak central coherence," or an inability to organize details into higher-level patterns or structures (Happe & Frith, 2006). This deficit may make autistic persons' perception of themselves and the world incoherent and fragmented. Further, autism has also been framed as an overarching executive function disorder, resulting in compromised problem-solving abilities and difficulty generating
new and flexible responses without external scaffolding (Russell, 1997). Both of these deficits may hinder individuals with autism from formulating and expressing their desires in complex social and spiritual situations. Finally, autism has been conceived as a pervasive difficulty in engaging with pretend play and symbolic, non-literal communications (Harris & Leivers, 2000), which may in turn hinder persons with autism from imagining meanings and beings beyond the here and now.

An emerging theory of autism links many of these existing paradigms to a central deficit in self-understanding. Just as persons with autism may be impaired in understanding others’ thoughts and feelings, they may have a difficulty in conceiving of their own mental states (Frith & Happe, 1999; Hobson, Chidambi, Lee, & Meyer, 2006). In line with the underconnectivity hypothesis of autism, recent studies of functional connectivity in autism (Cherkassky, Kana, Keller, & Just, 2006; Kennedy & Courchesne, 2008) suggest that autistic persons may not properly activate the network of regions associated with self-reflection (viz., the “default network” encompassing the medial prefrontal cortex, posterior cingulate, precuneus, and angular gyrus). As we shall see below, such deficits in self-understanding may lead autistic persons to use cultural scripts creatively, relying on their narrative structures as scaffolds for self-development.

While these theories provide important insights into the core deficits of autism, by studying them in isolation we may lose sight of the autistic person’s experience. Adding to the growing group of ethnographic studies of autism (Ochs, Kremer-Sadlik, Sirota, & Solomon, 2004; Nickrenz, 2007; Sirota, 2010), the present approach aims to provide a better understanding of the ways in which autistic persons orchestrate their unique set of strengths and weaknesses to provide meaning to themselves in the world.

**Religious Development and Theory of Mind: Predictions for Autism**

What happens when individuals with a neurodevelopmental disorder such as autism are raised in a religious setting? One of the recurring themes in theories of religious development is the idea that an individual’s relationship to the divine is modeled upon social relationships (Fowler, 1981; Boyer, 1994; Bering, 2002; Hay & Nye, 2006). Yet in autism, both the ability to relate to others, and consequently also the ability to fully appropriate cultural scripts, may be disrupted; thus, at both these levels, the emergence of religious belief could be impeded.

Bering (2002) proposes that our ability to infer others’ thoughts and intentions (theory of mind) served as the evolutionary basis for our auto-
matic search for meaning and agency behind events in the world (existential theory of mind). Just as we search behind words, gestures, and facial expressions to uncover the speaker's intent, we are prone to search for meaning behind certain life experiences (for instance, "I was in a bad car accident because I needed to learn that my life is fragile"; Bering, 2002, p. 4). Existential theory of mind is thus a certain kind of preparedness that leads us to represent some nondescript agency as the cause of experiences. Importantly, the nature of this sense of agency is shaped by cultural convention, and any religious or nonreligious entity may be cast in its frame.

Given the particular difficulty that persons with autism have inferring others' thoughts and intentions, alongside their relative talent for physical inference, Bering predicts that their view of the world would be patently mechanistic, focusing on how things work, not why they do so. Bering quotes several autobiographical reports by persons with high-functioning autism or Asperger's syndrome in support of his prediction, such as the following quotation from Temple Grandin, in which God appears more as a physical principle than a complex psychological agent:

I came to the conclusion that God was an ordering force that was in everything. ... In nature, particles are entangled with millions of other particles, all interacting with each other. One could speculate that entanglement of these particles could cause a kind of consciousness for the universe. This is my current concept of God. (Grandin, 1995, as cited in Bering, 2002, p. 14)

Similarly, Edgar Schneider reports: "The only thing that has deeply moved me [about religion] is the reasonableness of it all" (Schneider, 1999, as cited in Bering, 2002, pp. 14–15). Similarly, a man with Asperger's syndrome writing on an Internet bulletin board reported that he is "conscious of no feedback from the divine" (Bering, 2002, p. 15).

For Bering, these examples highlight the lack of a sense of deep interpersonal relation between the worshipper and God, or a sense of emotional dependency on an intentional agent who has control over the existence and experiences of the individual. In these quotations, autistic persons' view of the supernatural is mechanistic and impersonal. Bering goes on to predict that persons with autism would not automatically engage in meaning-making when confronted with life-altering events. They would attempt to engage in ritualistic activity (e.g., prayer), but would be unable to read any symbolic device through which a supernatural agent would "respond." Most persons with autism would show little interest in spiritual matters, and those who do, would do so primarily to learn how to engage in acceptable behavior within their community.
Bering’s predictions imply a complex set of characteristics, which may or may not appear in concert among different individuals. In order to test Bering’s thesis against my data, I classified this complex picture into a list of variables, designating different domains of religious experience according to which specific individuals might be categorized. These aspects of religious belief include (1) behavioral adherence to religious rules; (2) a sense of an agentive God giving meaning to events in the world; and (3) a deep interpersonal relationship with God manifest in the ability to pray and “read” events in the world as responses to the prayer. Importantly, I do not intend to place any inherent valuation on the presence or absence of belief, but rather to observe the varieties of religious beliefs reflected through the autistic “prism”.

According to Bering’s predictions, a person with autism may have ritualistic behavior, but would lack the affective, representational, and interpersonal aspects of the existential search for meaning, or the religious belief in God. Going beyond Bering’s anecdotal predictions, my research examined first-person accounts of religious belief in autism in order to test the hypothesized relation between interpersonal and religious understanding. Before proceeding to the results of the study, let me briefly describe the Jewish setting in which the respondents were raised.

The Setting: Why Judaism?

Judaism provides a unique setting to explore the religious development of children with autism due to its special emphasis on the behavioral performance of 613 biblical commandments and their derivations, alongside its lack of an explicit credo. As such, Judaism may be especially appealing to persons with autism, who seek structure and routine in their lives and struggle with more abstract theological and spiritual content. According to Jewish tradition, though spiritual intent (kavana) is encouraged, most commandments may be rewarded solely on the merit of their performance. Thus, Jewish-Israeli children and adolescents who choose to focus mostly on behavioral, rather than spiritual, aspects of their religious identity may nevertheless do so in a culturally legitimate manner.

Those who choose to believe in the spiritual realm may use several available Hebrew terms to frame their belief (though these terms do not appear in the respondents’ quotations below, they were implicit in our conversations). Bering’s notion of a higher agent directing events in the world can best be translated as kavana elyona, literally, “Higher intent.” Another term used by some of my respondents is hashgaha pratit, or “per-
sonal providence,” i.e., the idea that God is watching over each particular creature it has created. Different from the Anglo-Christian terms fate and determinism, hashgaha pratit and kavana elyona may hold either positive or negative connotations, and may allow for a variety of responses in the face of one’s destiny, as my informants’ responses illustrated.

In line with its emphasis on behavioral over spiritual performance, Jewish law treats children with mental disabilities, those with autism among them, according to their behavioral ability. Low-functioning, non-verbal children with autism are labeled with the Talmudic term shoteh (“imbecile”), and may be barred from reading the Torah to the community during a Bar Mitzvah ceremony (Amial, 2007). Certain rabbis, however, base inclusion on a case-by-case evaluation and may allow higher-functioning children (including all of my informants) to perform a modified Bar Mitzvah ceremony (Merrick, Gabbay, & Lifshitz, 2001).

Previous anthropological studies of autism and Judaism in Israel have focused on the perceptions of autistic children in the ultra-orthodox community as mediators to the spiritual world (Bilu & Goodman, 1997) or as the parents’ spiritual trial (Shaked & Bilu, 2006).² Importantly, my study moves beyond the perceptions of autism in religious communities and toward a person-centered ethnography of the religious experience of the autistic individuals themselves. Ultimately, by speaking with the children, I hope to recognize and privilege their thoughts and feelings, and further provide them with a key to self-understanding that goes beyond objective-level accounts of their development.³

**Methods: Participant Characteristics and Interview Procedures**

Participants in the study included sixteen autistic individuals (four girls and twelve boys) aged between 9 and 26 (mean = 15.3; SD = 5.34). Participants were recruited through local support groups for parents of autistic children in and around Jerusalem. All participants were Jewish, and their degree of practice ranged from ultra-orthodox to secular. All participants had previously received a diagnosis of Asperger’s syndrome or high-functioning autism from a clinical psychologist or a psychiatrist. Nevertheless, their level of functioning varied greatly. Some had severe speech impairments and could only communicate in writing; others had more subtle pragmatic impairments, noticeable in their difficulty in maintaining a common topic or making eye contact during conversation. The majority of the interviews were conducted in the subjects’ homes, with or without the parents present; three of the adult subjects came to my home independently. Two subjects were excluded from the analyses as their responses
were too incoherent or too minimal to be coded; one subject was excluded due to equipment malfunction.

The interviews were conducted in Hebrew and lasted between one and one and a half hours. They began with several background questions and simple descriptive questions regarding the respondents’ and their parents’ degree of religious practice (keeping kosher, Shabbat, holidays). They then proceeded to trace their religious education, in an attempt to understand whether their religious practices and beliefs had changed over the years, and whether the change was driven by personal choice. The interviews then proceeded to more personal questions of belief and the nature of their relationship with God as manifest, for instance, in their personal prayers and their perceived effect, and in the young people’s understanding of personal destiny and fate. Most of the interviews proceeded smoothly as subjects were very eager to speak and readily shared their private thoughts, beliefs, and doubts, though some had to write out their responses due to communicative difficulties. Feedback from several parents and caretakers confirmed that I had been able to gain their child’s trust and elicit from them sincere responses. The interviews were transcribed in full and coded thematically based on Bering’s domains of religious experience.

Varieties of Religious Experience: A Critique of Bering’s Existential Theory of Mind

The first observation found in the interviews was the overwhelming diversity and richness of responses I received, going beyond participants’ individual backgrounds to unique idiosyncratic views of religious practice. I will begin by a discussion of the subjects’ responses according to the criteria advanced by Bering and then offer possible explanations of the results.

Religious Adherence
As predicted by Bering, all of my informants who were raised in religious environments adhered to the religious behaviors practiced by their families and communities, which may fit with their attraction to structure and routine. Furthermore, none of my respondents had become (or planned to become) more zealous in their religious practice compared to those in their religious environments; nor did those who were exposed only to religious settings reject the behavioral performance of commandments. Thus, their diagnosis of autism did not seem to affect the behavioral aspect of their religious participation, as Bering predicts. At the same time, however, I
found a variety of interpretations given to these habitual acts. Some of the respondents viewed their behavioral acts as the ultimate performance of their Jewish identity and their sole vehicle of connection with God; while for others, religious acts served as a basis for further spiritual meaning-making.

Sense of Agentive God
According to Bering's predictions, given their difficulty with theory of mind, autistic persons would not read events in the world as directed by an intentionality writ large, adopting instead an impersonal mechanistic interpretation. Yet, of the thirteen interviews I analyzed closely, the majority of respondents—eight—expressed an agentive understanding of God (age and gender did not affect the distribution of responses). The remaining five expressed neither an explicitly agentive framework nor a deep mechanistic understanding, choosing instead to respond negatively with "I don't know," with silence, or with a simple change of topic. While these responses serve as certain glimpses of the participants' views, and may index a confusion or active avoidance of the topic, they cannot be equated with the explicitly impersonal and mechanistic views ascribed by Bering to Grandin and Schneider.

An example of agentive understanding was given by Moriah (pseudonym), an 18-year-old girl from a religious home, who describes her belief in God as the causal agent for her life experiences:

I believe there is a God in the world. There is no chance occurrence in the world. It can't be that I randomly appeared here, in this interview, or that I randomly went to school where I did, or grew up where I did. ... It's hard to think that everything is man's deed. Clearly there is something beyond our understanding that causes these things to be. I may have watered the tree, but it doesn't mean that thanks to that it grew; I could've watered it and it would've wilted.

Moriah's strongly theistic approach is indicative of a belief in kavana elyon, the idea that various events in her life were predetermed by God, including the current interview session. Yet despite the rigid predetermination this excerpt implies, she does not face her fate with resignation. Instead, she frames her personal will within the cosmological structure, as the following excerpt suggests:

I believe I'm part of a greater structure. I'm not the machine; I'm a small screw in the machine. ... We are all, in the end, part of a greater process that's been going on for 2000 years: the construction of the Temple, God willing. And, in order for Him to come, I need to ... act in the optimal way. ... The best things to do right
now are the commandments: to study Torah, to guard my tongue, not to gossip. ... We perform commandments and He speeds the coming of the Messiah.

Interestingly, though Moriah uses a mechanical metaphor to explain her understanding of the world, rather than being impersonal and random, Moriah's machine is imbued with agency both in her part as a "small screw" performing the commandments and in God's response of hastening redemption.

These views depart significantly from Bering's predictions, suggesting that some autistic persons may have an agentive view of God. These beliefs may be common among the respondents' age group and background (and future research should determine their extent). Nonetheless, their very presence, where their absence was predicted, is striking.

Still, a possible interpretation of these results might be that the respondents are simply repeating the cultural scripts available to them. While Moriah's choice of scripts is telling, it may not reflect the spontaneous religious meaning-making which Bering postulates as being dependent on theory of mind. I now turn to examples of respondents who used their cultural structures to give novel meaning to their lived experiences and who created unique interpersonal relationships with God.

**Interpersonal Relationship with God**

Of the thirteen interviews I have analyzed, two respondents went beyond simple repetitions of existing religious scripts to "read" God into events in their lives. Twenty-one-year-old Amichai, who was raised in a variety of religious settings, brought God into his life by foregoing his financial responsibility and trusting God to intervene:

**RSB:** So do you feel the presence of God?

**Amichai:** Yeah, sure.

**RSB:** How do you feel it? Have you ever asked God for something?

**Amichai:** Yes, for instance I just bought a bike that cost me 5000 shekels [approximately $1200] and suddenly I realized I had no money in my bank account. So I said to myself: if it comes it comes, and if not, we'll figure it out. As soon as I spoke, within a week, after several months of being unemployed, I got two jobs offers [and earned 6000 shekels]. ... This shows God's presence in the world.

In the context of Jewish-Hassidic tradition, Amichai's lack of action can be interpreted as a way of exhibiting his trust in God, which is then rewarded by His speedy and accurate response. Going beyond a passive repetition of cultural scripts, Amichai frames his personal dilemma and
inner speech as perceived by God, and is thus prepared to view the resolution of his crisis as His answer. Thus, Amichai uses the religious frame to give meaning to his moments of crisis and their resolutions.

Similarly, Yoav, a 16-year-old boy who grew up in a traditional home and has recently followed his uncle in becoming more religious, brings God into his life by negotiating a particular agreement:

**RSB:** So do you wear tefillin on weekdays? [Tefillin are phylacteries—a ritual object which observant men are required to wear during weekday prayers.]

**Yoav:** No. The truth is ... I have an agreement with God that if he fulfills my wishes, then I put them on.

In the context of a tradition in which the performance of basic commandments, such as putting on tefillin, is seldom questioned, Yoav's decision to condition his own acts on God's responses is striking. Indeed, implicit in his agreement is the expectation that God communicates with him on a daily basis, allowing Yoav to decide whether or not he should put on his tefillin. Yoav clearly demonstrates an interpersonal relationship with God, a feeling not only that an agent directs events in the world, but that human beings have a say in this relationship. In both of these examples, the spiritual realm does not operate simply in a distant, mechanistic fashion; the supernatural permeates everyday life, interacting with Amichai and Yoav's thoughts and desires. Such views are indeed remarkable in the context of Amichai and Yoav's Jewish background, which does not mandate a belief in the spiritual effects of prayer, and allows for a religious practice based only on the performance of commandments if they so choose.

These findings are difficult to reconcile with the social difficulties alleged in autism, which, according to several theories of religious development (Fowler, 1981; Bering, 2002; Hay & Nye, 2006), would preclude persons with autism from expressing a belief in God as an agent directing events in the world. The first possible explanation, suggested above, is that the majority of respondents may have been repeating religious scripts which they had heard, and thus their religious beliefs can be attributed more to their cultural background or age than to their autistic way of thought. Indeed, the same critique may be voiced in relation to Schneider and Grandin, whose views may have been shaped more by their cultural surroundings—academic physics and engineering—than by their clinical condition of autism. Nonetheless, the presence of agentive, and even interactive, views of God, especially in a Jewish context that emphasizes behavioral practice over belief, warrants further inquiry.
The second possible explanation, which the study was not designed to refute, is that the group of children who exhibited agentive views of God was part of the minority of autistic children who can pass theory of mind tests (Ozonoff, Rogers, & Pennington, 1991). Having determined in this case study that Jewish autistic children can in fact hold agentive views of God, future studies should continue to investigate the necessity of theory of mind for religious development by incorporating theory of mind tests into studies of religious development in both autistic and typically developing populations across different religions.

My current data cannot conclusively refute the possibility that religious belief arises from interpersonal understanding. Yet the findings may suggest that there is also an alternative route to religious belief, which some persons with autism may use in order to develop beliefs such as the ones manifest in my interviews. Importantly, the use of such a route need not be limited to persons with autism, but may provide an account of a parallel route to religious development employed also by typically developing children.

In the following section I suggest, based on further evidence from my interviews, that such a parallel route to religious development can be achieved through narrative appropriation. Moreover, based on recent evidence from autism research, I suggest a shift of focus from the difficulty persons with autism have in understanding others, to their more primary difficulty in understanding themselves. If indeed one of the deficits in autism is a difficulty in stringing autobiographical events into a coherent sense of self, we could explain their religious beliefs as a coping mechanism that provides structure and meaning to their past and future selves. More broadly, despite their impediments in accessing cultural scripts (due to their interpersonal difficulties), autistic persons would nevertheless be more inclined to incorporate such scripts into their sense of self to compensate for their delayed self-development. Though this third, alternative, explanation is a tentative sketch for religious development in autism, its importance lies in providing new, testable hypotheses for the phenomenon of religious acculturation.

**Religious Narratives and Self-Understanding in Autism**

The theoretical insight for my alternative explanation of religious development in autism emerged from a story told to me by Nethanel, an ultra-orthodox 10-year-old boy. Rather than providing a simple answer to my question, "Will you continue being religious when you grow up?" Netha-
nel began recounting an elaborate story that took about ten minutes to unfold and at first seemed completely irrelevant. In brief, the protagonist was a boy who had been cursed before his birth: on the day of his Bar Mitzvah, he would become Christian. His adoptive father (who, through a complex set of events, happens to be the Hassidic rabbi who issued the original curse) unknowingly sets the boy’s engagement and plans the boy’s wedding in conjunction with the day of his Bar Mitzvah. When the rabbi discovers the horrible turn of fate, a great spiritual combat ensues, and at the last moment, thanks to the rabbi’s fasts and prayers, the child is saved from the “impure force” which has invaded his body. Nethanel did not answer my question directly, nor did he refocus his narrative when I interjected to ask about the relevance of the story to my question. Yet as the subsequent conversation between us clarified, Nethanel intentionally used this Hassidic story to convey to me that he does not know whether he will stay religious when he grows up, as some external force might determine the course of his life before his thirteenth birthday.

Nethanel’s story expressed a strong sense of kavana elyonah (Higher intent) and a weak sense of agency both in content and in form. First, similar to the agentive views of God presented in the previous section, the story expresses a certain degree of resignation in face of “external forces,” relegating even his own belief to external factors. Moreover, this passivity is reflected in the very structure of his discussion: using a story he has heard in order to reflect on himself and refusing to answer my direct questions, rather than engaging in simple introspection and future projection to think about whether he would like to stay religious. Expanding on Nethanel’s use of narrative, and reviewing the emergent literature on delayed self-development in autism, I suggest that autistic individuals may use cultural narratives to compensate for their weak sense of self. By appropriating religious narratives as proxies for their personal identity, they may thus situate themselves within a particular cultural landscape and at the same time articulate their own unique path.

Several studies of narrative ability in high-functioning autism have noted that while autistic individuals are capable of repeating existing narratives in great detail, they have difficulty composing coherent autobiographical narratives (Happe, 1991; Bruner & Feldman, 1993; Losh & Capps, 2003). These experimental data were further echoed in Solomon’s (2004) naturalistic ethnographic study, which found that while autistic children were just as likely to launch narratives into conversation as their non-autistic interlocutors, their narratives were more likely to be fictional and preorganized, compared to the personal narratives their non-autistic
interlocutors introduced. Rather than reflecting a general impairment in narrative ability, these findings may be readily explained by recent findings on memory abilities and self-understanding in autism.

Recent research on memory in autism has consistently found a discrepancy between autistic individuals’ poor autobiographical memory relative to their normal (or above-normal) memory for semantic facts and given narratives (Boucher & Bowler, 2008; Lind, 2010). These data further add to accumulating research on the development of the self in autism, suggesting that individuals with autism may have difficulty encoding self-experienced events and tying them to a coherent sense of self (Hobson et al., 2006; Lind & Bowler, 2008). On a neurobiological level, autistic persons may have difficulty activating several midline structures of the brain during resting states, which in typical individuals are associated with routine self-reflection, memory, and future planning (Cherkassky et al., 2006; Kennedy & Courchesne, 2008; for further neuropsychological studies of the self in autism, see Uddin, Davies, Scott, Zaidel et al., 2008; Lombardo, Chakrabarti, Bullmore, Sadek et al., 2010). If autistic persons do not spontaneously turn to self-reflection and social reflection during resting states, this may impede their ability to incorporate experiences onto a coherent sense of self in relation to others (Jacoboni, 2006).

Autistic persons’ difficulties with personal memory and self-understanding may also be reflected in their reduced sense of agency: without a coherent sense of past and present selves, they may have difficulty planning and projecting on to the future. Together, these studies are creating a shift in focus within autism research from the development of social understanding and theory of mind to the perhaps more basic development of the self. Yet how does this emerging paradigm of autism fit together with research on the religious lives of autistic individuals?

Though I did not originally set out to examine how religious beliefs might be influenced by a weak sense of self, a rereading of my transcripts confirmed this unique pattern of findings on self-understanding and narrative abilities in autism. On the one hand, many of my respondents exhibited limited autobiographical recall and a weak sense of agency. For example, one mother told me of how her 16-year-old boy was unable to choose what to eat for dinner and would roll dice every evening to decide. At the same time, many respondents had a strong attraction to prestructured narratives such as Harry Potter, The Transformers, Dungeons and Dragons, and Hassidic tales, depending on their cultural background.

Importantly, if we were to examine these autistic abilities in isolation, we might come to the conclusion that persons with autism are capable of
repeating prestructured narratives, but that they are incapable of using them flexibly and creatively as scaffolds or models for self-construction (Bruner & Feldman, 1993). However, ethnographic studies provide evidence to the contrary. In their work on identity construction in autism, Sirota (2010) and Nickrenz (2007) demonstrate the ways in which personal interests in finance and dinosaurs or narratives shared at dinnertime conversations serve as frames for the construction of identity. Together with my own findings, they point to ways in which autistic individuals may use their talent (and passion) for repeating prestructured narratives to creatively construct their sense of self in relation to the world.4

While for most of my respondents the fictional and personal realms remained independent, some respondents chose to weave the two realms together, as we find in Nethanel's use of a Hassidic story to reflect on his own religious identity. A further example of interplay between personal and fictional narratives was presented to me by Nir, a 16-year-old secular boy, who made creative use of his immersion in Dungeons and Dragons (D&D) to express his sense of agency in the world:

Nir: I'm an avid D&D player. I mostly ... control games. I am the Dungeon Master. ... This whole game is like playing within a book and writing it at the same time.

RSB: Interesting. So you feel that this gives you control?

Nir: Yes, it gives me control over the story, and to the players it gives control over their future fate. ... That is, I can invent towns, and I can invent plains, and I can invent monsters, and I can invent professions, and I can invent anything I want! ... Gods? The Dungeon Master plays them!

Rather than treating the game of D&D as a predetermined narrative and reacting to it passively, Nir uses his knowledge of the game to exert his agency. He uses different tactics to convey his control over other players and even reenacts gods. Akin to Nethanel's use of religious narratives to express his thoughts about his personal future, Nir uses the cultural scripts available to him to construct his personal identity by playing out different agentive beings. Though their approach to the spiritual realm differs markedly—Nethanel expressing passivity and resignation before God and Nir expressing his God-like power over others—their means of expression ultimately serves the same function. Rather than speaking separately about their passions for fiction and their personal experiences and goals, the two become merged in their natural discourse, scaffolding their personal identity.
At the same time, we cannot tell whether Nethanel and Nir have achieved a degree of flexibility and fluency in their personal storytelling expected of their developmental stage (Miller, Hengst, Alexander, & Sperry, et al., 2000). One therapeutic application of this neuroanthropological research may be that caretakers can help autistic persons by co-narrating fictional narratives with them, pointing to ways in which their lives parallel fictional characters' lives, and thus helping autistic individuals to gain a better understanding of themselves.

In sum, the interviews point to possible ways in which cultural scripts served children with autism as bootstraps for self-construction and acculturation. Rather than maintaining the domains of fictional and personal knowledge separate, as experimental studies of memory and narrative ability in autism may suggest, some autistic individuals can harness their immersion in fictional and religious narratives to help shape their sense of self. Though I did not directly examine the degree of self-understanding and agency among my participants, by ascribing agency to God and appropriating religious narratives, my respondents may have compensated for a weak sense of self-understanding and personal agency. Thus, children who grew up in religious settings may cast their interpretations in religious narratives, providing them an alternative route to religious understanding which does not rely solely on interpersonal inferences; and those who grew up in a secular setting may use the narratives accessible to them to construct visions which extend beyond reality, giving transcendent meaning to events in the "here and now."

Conclusion

The present neuroanthropological study examined the ways in which persons with autism, equipped with a unique neuropsychological foundation, interact with their cultural surroundings. Specifically, given their difficulty inferring intentionality in others, Bering (2002) predicted that autistic persons would fail to develop agentive views of God. A series of in-depth interviews with Jewish children and adolescents with high-functioning autism in Israel revealed instead that autistic persons can hold an agentive view of God as directing events in the world, and a minority can even engage in a more personal exchange with God. Together, these findings point to the necessary existence of alternative routes to religious development. Drawing from further interview data and a review of new findings on impaired self-development in autism, I propose that rather than being incapable of developing a full religious understanding due to
their neuropsychological limitations, some autistic persons may in fact be attracted to religious narratives as scaffolds for self-development.

What was most striking about the variety of religious responses exhibited by the Jewish autistic children in this study was not their lack of cultural competence, but rather, the degree of cultural adaptations they were capable of making given their neuropsychological limitations. Rather than remaining passive or apathetic in face of the religious materials they were exposed to, some of them actively interacted with those materials, struggling to interpret and live through the scripts they had heard, and even harnessing them to further their own self-growth.

On a broader level, these findings point the remarkable potential of the human brain to adapt and relate to cultural materials. To return to the analogy of autism as a "cultural aphasia," just as deaf children who have never been exposed to language may develop their own idiosyncratic sign language (Senghas & Coppola, 2001), and brain-injured children may make use of non-linguistic regions of the brain to acquire language (Feldman, 2005), in the same way, and despite their neuropsychological limitations, autistic children may use any of their available neuropsychological resources to satisfy their propensity for cultural learning. To return to the analogy of the prism, rather than blocking certain elements of culture from being exhibited, the neuropsychological constraints of an autistic mind may push the autistic person to use their mental and cultural resources creatively, coloring the cultural scripts that they appropriate with new hues. It remains to be determined how and why certain autistic persons succeed in appropriating cultural scripts to further their own development; and perhaps by examining this process we may find new therapeutic ways of bringing out the cultural potential in children and adolescents with autism who do not yet exhibit it.

This study has important implications for the two domains that inform it—religious development and autism—while at the same time setting the stage for further neuroanthropological inquiries. First, through an observation of the religious development of children and adolescents with autism, this study contributes to the ongoing debate regarding the neuropsychological foundations of religious belief, and in particular, the role of theory of mind (Whitehouse & McCauley, 2005). Though my findings cannot refute the role of theory of mind in typical religious development, the fact that religious belief may exist among autistic persons, even in a cultural context that would allow otherwise, suggests that there are potential compensations for lack of theory of mind. Further studies should continue to explore the relationship between theory of mind, self-understanding, and
narrative ability in children's religious development. By measuring and comparing these different variables in both typically developing and autistic children, in different religious settings, we may determine the relative contribution of each to their religious development, and further explain the vast individual differences in patterns of cultural appropriation.

Second, while most studies of autism are experimental in nature, breaking down the complex profile of autistic persons into discrete abilities and disabilities, such an approach inherently prevents us from examining the ways these skills may (or may not) become integrated. The current study contributes to the growing corpus of anthropological studies of autism (Ochs et al., 2004), providing a more naturalistic account of the ways in which autistic persons orchestrate, rather than isolate, their various strengths and weaknesses. More importantly, while most psychological and anthropological studies of autism focus on individuals' negotiations with the "here and now," the present research demonstrates how expanding our lens of research onto autistic children's relation with the spiritual realm may in fact illuminate ongoing debates regarding the relative importance of theory of mind and self-development as core deficits of autism.

Finally, by observing the interaction between the mental architecture of the autistic way of thought and the Jewish environment in which it is immersed, the current research sets the stage for the expansion of psychological anthropology into neuroanthropology: from an exploration of personhood across cultures (Hallowell, 1955; Shweder & LeVine 1984), to an exploration of acculturation across different neurological capacities. Drawing on the established tradition of cultural psychiatry (Devereux, 1970; Kirmayer, 1989; Kleinman, 1988), and complementing the burgeoning field of cultural neuroscience (Chiao, 2009; Han & Northoff, 2008; Kitayama & Park, 2010), neuroanthropological research on different clinical or brain-damaged populations would thus provide the necessary testing ground for particular neural-cultural hypotheses.

For instance, some of the same anatomical structures that have been implicated in autism—the amygdala, the medial prefrontal cortex, and the superior temporal sulcus (Amaral, Schumann, & Nordahl, 2008; Pelphrey, Adolphs, & Morris, 2004)—are also found to mediate culturally varied behaviors (Chiao, Adams, Tse, Lowenthal et al., 2008; Kitayama & Park, 2010). Moreover, the underconnectivity hypothesis of autism may likely become a useful model for explaining the neural bases for cultural development (empirically, for instance, we may find that individuals such as Nethanel and Nir, who use cultural scripts creatively to compensate for
their reduced sense of self, have greater connectivity in self- and social-networks than other autistic persons).

As we continue to use autism as a case study for acculturation, it is also important that we expand the study of neuroanthropology to other clinical populations. First, it is important to examine the breakdown of cultural abilities at different points in the lifespan: while autism provides a compelling case for early-onset cultural impairment, in order to tease apart abilities from compensations it is important to examine adults who have functioned as fully cultural beings, and are struck by a late-onset disorder such as schizophrenia or dementia to determine which cultural capacities are maintained despite the brain damage, and which are lost.

Second, it is important to complement research on persons with an all-encompassing brain disorder such as autism with research on persons with closely delineated brain damage. Following in the tradition of classic neuropsychology (Harlow, 1848; Broca, 1861; and see Anderson & Phelps, 2001, and Mendez, Lauterbach, Sampson, & ANPA Committee on Research, 2008, for modern-day approaches), neuroanthropologists may shed new light on the limits of cultural abilities exhibited by persons with lesions to the amygdala, the superior temporal sulcus, or the prefrontal cortex. By bringing the well-honed tools of ethnographic research to such clinical populations, neuroanthropologists will thus provide major contributions to the field of neuropsychology, while at the same time generating and testing new hypotheses regarding the neural bases of culture. Together, the triangulation of neurological, clinical, and ethnographic research will pave the road for an interdisciplinary study of neuroanthropology.

Notes

1. A language disorder caused by brain damage.

2. For related views within the Anglo-Christian world, see Stillman (2006) and Isanon (2001); for an in-depth ethnographic study of Muslim-American parental views on autism, see Jegatheesan et al. (2010).

3. At the same time, I am acutely aware that any academic research aiming to "unravel" the autistic way of thought and "give voice to the hidden child behind the fortress," including my own work, may be influenced by the Romanticist idea that meaning can be gained from studies of the mentalities of children with disabilities. It is interesting to trace the historical progression of ideas about mentally disabled persons, and to view our current academic pursuit as another variant of the religious search for "truth" in the mute and retarded (following Foucault, 1961).
For comprehensive accounts of the construction of autism within Western psychiatry and other cultures, see Nadesan (2005) and Grinker (2006).

4. Importantly, not all persons with autism may be equally disposed to create such integrated constructions, and further research should determine what individual and situational constraints can be removed to help autistic individuals integrate their strengths and weaknesses.

References


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