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CASE STUDY

Sensory supernatural experiences in autism

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ABSTRACT

This study examines attribution of supernatural agency in 17 Swedish, high functioning young adults on the autism spectrum, who describe sensing presence, feeling touch, and seeing visions without input of somatosensory stimuli. These participants report many more such incidents than the matched, non-autistic group participants, and current research suggests that unusual somatosensory experiences are prevalent in the autistic population. Attribution of invisible agency is understood as a sense-making coping strategy, and it is argued that esoteric content in fantasy literature, movies and computer games explain why these young adults prefer to attribute agency to ghosts, spirits and demons, rather than god(s). The study thereby extends and challenges the study of autism and religiosity by exploring the intersection between autistic embodiment and enculturated cognition.

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Supernatural experiences; autism; somatosensory processing; agency detection; sense-making; popular culture; enchantment

It has been argued within the cognitive science of religion (CSR) that the automatic ability to “read” minds underpins the cross-cultural and persisting tendency to believe in gods, angels and spirits (e.g., Barrett, 2004, 2012; Bering, 2002; McCauley, 2011; Tremlin, 2006). Autism, which offers a case of mentalizing difficulties, has therefore become a focal point for exploring the correlation between (un-)belief in superhuman agents and theory of mind (ToM) in the high functioning autistic (HFA) population (e.g., Lindeman & Lipsanen, 2016; Maij et al., 2017; Norenzayan, Gervais, & Trzesniewski, 2012; Reddish, Tok, & Kundt, 2015), but results have varied and replications have failed (e.g., Jack, Friedman, Boyatzis, & Taylor, 2016; Maij et al., 2017; see also Visuri, 2018a).

While CSR has grown to include a large number of empirical studies on bodily experiences that are deemed religious, spiritual or mystical (see Andersen, 2017, pp. 7–8; Taves & Asprem, 2017), there are as yet (to the best of my knowledge) no such publications that relate to individuals on the autism spectrum, despite the fact that autism also is a case of unusual sensory processing. To address this research gap, this article introduces empirical material from an in-depth study involving 17 HFA1 young adults who describe their worldviews as “religious” or “spiritual,” and report embodied experiences that they label in supernatural terms. The study draws on an anthropological approach that allows for insights from inside the autism spectrum, and offers unique perspectives on religiosity from an autistic point of view. Besides contributing empirical data, this article also considers autistic religiosity and agency detection in terms of interaction between embraimed, embodied, and encultured cognition.

The aim is to (1) examine how the participants come to understand unusual somatosensory experiences, such as sensing invisible presence, seeing visions, or hearing voices in supernatural terms, and (2) investigate whether autistic individuals differ from the matched, non-autistic participants regarding the prevalence of such experiences. Drawing on a mixed methods design, the study begins with thick and rich descriptions in qualitative interviews, as well as quantitative data from

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questionnaires. Since this in-depth study is of exploratory character, hypotheses are extrapolated from the empirical material, rather than being pre-formulated.

The first research question concerns how attributions are made, in line with Taves’ (2009) argument that *ascriptions* of supernatural qualities to unusual experiences should be the focus of researchers’ attention. How do the participants come to understand that superhuman agents are involved? The second question concerns the prevalence of unusual, somatosensory experiences in the autistic population in comparison to a matched non-autistic sample. Ontological questions of what is “real” or not fall outside the scope of interest, and the focus is instead directed towards how people come to understand that invisible agents, such as ghosts, ancestors or spirits, are present (cf. Luhrmann, Nusbaum, & Thisted, 2010).

**Literature review**

There is a vast body of research on atypical processing of somatosensory input in autism (e.g., Crane, Goddard, & Pring, 2009; Horder, Wilson, Mendez, & Murphy, 2014; O’Neill & Jones, 1997), and it has been suggested that as many as 95% of the individuals on the autism spectrum have unusual sensory or perceptual experiences (Tomchek & Dunn, 2007). These involve hypo- or hypersensitivity, sensory fluctuation (Smith & Sharp, 2013), and desynchronization of stimuli from various modalities (Foss-Feig et al., 2010).

Studies of unusual perceptions that occur without input of external stimuli have also emerged, and results suggest that unusual perceptions are more frequent in the autistic population. In Milne, Dickinson, and Smith (2017), 63% of the HFA participants had experienced touch without anyone being present, and 47% had seen shapes, light and colors that were not caused by external stimuli. Only 7% in the comparison group reported tactile experiences, and 14% reported visual anomalies. Milne and colleagues note that as many as 28 of 30 HFA participants scored higher than the mean score for the comparisons, and hypothesized that a majority of HFA individuals may have such experiences.3 Similar results were also found by Horder et al. (2014).

Turning towards studies that involve ontological interpretations, Ekblad and Oviedo (2017) found that reports of paranormal experiences and belief in ghosts were more common among autistic participants. In Veissière’s (2016) study on so-called “tulpa practitioners,” using meditative techniques to evoke sentient companions that can be seen and heard outside one’s own body, 25% identified with Asperger’s syndrome/HFA. This result was replicated in a study by Isler (2017), in which 28% of the tulpa practitioners reported having an autism diagnosis. As a point of comparison, the estimated prevalence of autism in the general population is 1.68% (Baio et al., 2014). While Isler suggests that social difficulties make certain autistic individuals drawn to invisible and intimate relationships, Veissière argues that many tulpa practitioners report having had imaginary companions since childhood. Invisible relationships may thus be specifically relevant to a subgroup of autistic individuals who experience sensed presence. Invisible companions are also reported in several other studies involving autistic subjects (Calver, 2009; Davis, Simon, Meins, & Robin, 2018; Holliday Willey, 2011; Visuri, 2018a).

These results suggest that unusual, somatosensory experiences are prevalent among autistic individuals, which seems plausible when considering that atypical sensory processing is at play in autism. This is, to the best of my knowledge, the first publication that examines subjective narratives of experiences that autistic individuals come to deem as supernatural, and comparing the prevalence of such experiences between an autistic and a non-autistic sample.

**Methods**

**Participants**

A selection of individuals who identified as both autistic and religious/spiritual was recruited to access insights on autistic religiosity. Seventeen participants (12 males and 5 females, 16–21 years
of age) who were enrolled in schools for pupils with a formal autism diagnosis consented to partici-

tate. Testing of verbal and fluid intelligence was conducted to confirm that everyone was on the high
functioning end of the spectrum. An equally large comparison group was recruited and matched
according to age, gender and philosophy of life. The Autism quotient-questionnaire (AQ; Baron-
Cohen, Wheelwright, Skinner, Martin, & Clubley, 2001) was used to confirm that the participants
in the comparison group were not on the autism spectrum, and one participant was removed due
to high scores.

**Materials**

The field of research on religiosity in autism is in its infancy, and methods that usually are considered
valid may miss the target when applied to atypical populations (Visuri, 2018b). McGrath moreover
argues that difficulties may arise when non-autistic researchers attempt to describe autism: “many
so-called representations of autism—most of which are authored by and primarily aimed at neuro-
typicals (non-autistics)—rely on, and reinforce, misleading assumptions, stereotypes and expecta-
tions regarding autistic people” (2017, p. 1). To avoid such pitfalls and strengthen the validity
of results, this study draws on an anthropological design that has been adapted to meet the con-
ditions of autistic participants.

Mixed methods were utilized. First, a quantitative comparison was made (see Figures 1 and 2)
based on data from the supernatural experience subscale of the Kendal project questionnaire (Heelas
& Woodhead, 2003). The subscale consists of 15 yes/no questions, and demonstrates good reliability
and internal consistency ($\alpha = 0.84$). Next, qualitative interviews were conducted to examine the pro-
cess of supernatural attributions. These thick and rich descriptions were subsequently triangulated
with the quantitative data, which means that quantitative and qualitative data was “put in dialogue
with each other” (Mertens & Hesse-Biber, 2012, p. 78). This dialectic method is similar to a grounded
theory approach, where a hypothesis gradually grows out of the data, as opposed to using data to
evaluate a pre-established hypothesis.

On a terminological note, supernatural experience serves as an umbrella term, and is defined as
“perceptions embedded in a religious or spiritual framework” (Andersen, Schjødt, Nielbo, & Sorensen,
2014, p. 224). This includes emic labels such as paranormal, religious, spiritual or mystical. In a
pragmatic sense, it seeks to capture somatosensory experiences such as sensed presence, touch,
visions and sounds that occur without any observed external stimuli, without deliberate cultivation of one’s inner senses (cf. Luhrmann et al., 2010), and which are labeled in supernatural terms.

Ethical approval for the study was gained from the Swedish Ethical Review Board, and the study follows guidelines for good research practice (Swedish Research Council, 2011). All participants have for instance given their informed consent, and have chosen their own pseudonyms for de-identification.

Procedure

The material for the study was gathered during three years of fieldwork (2014–2017) in three different schools. In order to establish mutual and trustful relations and make the participants (and other autistic pupils) comfortable with the presence of a new adult, the researcher visited lessons, joined the pupils and teachers for lunch, and socialized in the common areas. Each participant took part in four individual meetings. Questionnaires and psychometric tests were first introduced, and the researcher aided those who requested assistance in reading or writing. These meetings further contributed to the building of rapport and trust, and enabled a deeper understanding of topics that were brought up in the subsequent interviews. The comparison group finalized the quantitative measures in two meetings, but were not interviewed since qualitative comparisons are both time consuming and complicated to analyze comparatively.

In order to access autistic perspectives, the traditional interview procedure was overturned. A visual interview method was designed to (1) access autistic perspectives, (2) make the procedure more predictable for the participants, and (3) reduce cognitive load during the interview. The participants were instructed to prepare their own interviews by taking photographs and notes that would illustrate their personal philosophies of life. Due to difficulties with social imagination, autistic individuals may become hesitant when given tasks by others, and the researcher therefore provided a list with 20 examples of possible themes to depict (alphabetically ordered; e.g., books, images, people,
places, rituals, sounds). The researcher moreover suggested topics that had emerged during previous meetings. When a participant reported that preparations were finished, s/he was invited to guide the researcher through the prepared material (e.g., photographs, notes, pictures on mobile phones and laptops). This procedure turned out to be successful, and several participants expressed their appreciation of a safe space where they were free to discuss their philosophies of life.

**Interview coding**

The interviews (45–75 minutes long) were transcribed and coded according to the interpretative phenomenological analysis (IPA) methodology. This qualitative method is used in cognitive psychology to capture rich and thick descriptions of subjective experience, such as beliefs and perceptions (Smith, Jarman, & Osborn, 1999). Interviews were transcribed verbatim and coded thematically. Themes that did not have enough support in the material were excluded, and others were collapsed into joint themes. Gradually a master table with main themes emerged, and those that relate to supernatural attributions are analyzed and discussed below.

**Results**

**Triangulated data**

The results from the supernatural experience subscale (see Figures 1 and 2) highlights substantial differences between the groups. The mean score for religious experience is higher for the autistic group, who report of many more types of supernatural experiences (M = 4.71; SD = 3.69) than the matched non-autistic comparison group (M = 1.94, SD = 0.90). A two-tailed t-test was conducted to confirm that this difference is significant (t equal variances not assumed = −3.00, p = .008) with high statistical power (Cohen’s d = 1.21). The distribution in the autism group is also more varied, which suggests that unusual somatosensory experiences cannot be generalized across all autistic individuals.

Examining the distribution between the different items, the comparison group has a sample maximum of 4 types of experiences, while 9 of the autistic individuals report of 4–13 types. Analysing the different kinds of experiences (see Figure 1), the matched comparisons most commonly reported experiences that are in line with traditional religiosity, such as prayer response (f = 7) and felt presence of God (f = 4), while the autism group reported a broader variety of experiences, with most responses on felt presence of a spirit (f = 13) and “other” supernatural experiences (f = 9).

An additional analysis of the interviews illustrates that three of the five autistic individuals who say that they believe in God (Anastazia, David and Edgar) nonetheless interpret that their sensory experiences were caused by spirits or ancestors. Seven participants (Elise, Anastazia, Boyan, David, Edgar, Frank and Gustav) moreover describe these sensations as spontaneous and recurrent since childhood. This result matches Veissière’s (2016) argument that autistic individuals who involve in the supernatural may have long experience of such sensations.

**Narratives on supernatural experience**

In the coding of interviews, supernatural experiences were arranged in two clusters. The first represents experiences of embodied character (see Figure 3): nine participants describe sensing presence of invisible bodies, five describe sensing touch, nine describe visual experiences, three report of auditory experiences, and one person reports of an olfactory experience. Henceforth, these are referred to as embodied or somatosensory experiences.

The other cluster consists of experiences of disembodied character, such as dreams (e.g., premonitions and déjà vu) and divine agency (e.g., experiencing response to prayer, remarkable coincidences). These will not be analyzed further in this article, but serve as examples of how the qualitative analysis was conducted. Focus is instead directed towards unusual embodied experiences.
that occur when awake. Due to limited space, only the most common categories (sensed presence, touch, and visions) will be exemplified and discussed below.

**Sensed presence**

In the interviews, supernatural attributions are generally depicted in affirmative terms, such as in the many narratives on sensed presence. Gustav describes how these sensations began in his teens, and says that he was initially confused since he did not understand the cause of these perceptions. He first assumed that they were triggered by stress due to family matters, and later he thought that radiation from the Chernobyl disaster in Russia might be involved. Since there were also coincidences that seemed too unlikely to be random he gradually began thinking that invisible intentionality might be involved.

Gustav now interprets these daily sensations in terms of presence of invisible spirits (sometimes called *demons*): “I don’t see someone standing there but I feel it, we talked about spirit vibes and I get a sensation that someone is standing there now.” He also explains that he is able to sense what mood they are in, and what intentions they have:

> They get annoyed because they live first, but then when they die they are restored, but they can’t, they somehow still live in their past experiences, they live as souls so to speak. And if they ever see anyone doing anything stupid they get really annoyed, and I can understand that. I mean these really stupid mistakes that people do when they are careless, that’s the kind of things they get really annoyed at.

Importantly, Gustav’s initial anxiety is now transformed into a notion of being gifted with an intuitive capacity for sensing the supernatural: “it kind of weighed me down, I didn’t really know how to handle it. But now it’s more of an advantage. […] I don’t have to spend as much time as other people to understand things.”

Frank similarly describes how he gradually learned to make sense of embodied experiences. He labels his sensations as feeling “presences,” and says that he has had these for as long as he can remember. During daytime, there are too many other stimuli for him to discern these subtle sensations, but in the evenings he senses how invisible bodies enter his room: “when I’m alone it
gets more clear that it’s not only the others [around me] that I sense but it’s also a lot of other things that I also feel, as one large presence.” This has also occurred when he is alone in nature, as described in the following account:

Well … I woke up very early, it was summer so the sun was rising like 3 am so I woke up and got out of bed because I couldn’t get back to sleep. We were in our summerhouse, and there is a forest that I walked into and strolled around. And it was really weird because I walked there and there was nobody, no one else was around, but it really felt the same way as if I would walk through a crowd. It felt as if there were, like people, or not people but live things around me. And it was kind of nice because there was no one there but it really wasn’t empty of life, even though you couldn’t see anything it felt as if … it must have been something about the forest being alive.

Frank’s comment about the forest “being alive” reflects a philosophical framework that he has come to formulate over time: all live things have an ever-lasting presence, and when the material aspect of plants, animals and people decays and becomes soil, this presence remains in the world. It is this “radiation” of past lives that he senses. Frank describes these sensations as enjoyable, and also holds that they add existential comfort: “… it’s still quite soothing to think that, I mean even if I would die then I wouldn’t disappear. And even if the earth would explode then everybody would kind of become stardust and be there in space, like presences.”

While the invisible agents in Frank’s narrative are somewhat undefined, other narratives contain descriptions of deceased relatives. Anastazia for instance tells of a significant moment of grief soon after her grandfather has passed away:

[I was] crying like when you are lying in foetal position and let all feelings out just because you haven’t shown anything before. […] And then I really felt that he was there and he looked at me and, I don’t know, comforted, it felt good to have some kind of presence, I kind of felt his presence in some … I don’t know, it can’t be explained. But I felt … so much better after that than before, well it was kind of a relief.

While feeling her grandfather’s presence, Anastazia tells him how sorry she is for not being able to keep in touch, and feels that he understands that it was not her fault: “So it was like, well I don’t know, I was forgiven for what had happened, that I hadn’t been there before.” For Anastazia the sensation of presence offers her a comforting relief from feelings of guilt.

Supernatural ascriptions thus appear to perform a comforting function, and can be described in terms of a coping mechanism. The resemblance between these narratives and common cultural ideas of the presence of invisible forces is also interesting. Frank for instance reasons that “energy cannot be destroyed, it can only be transformed, and I think it’s kind of like that with the presence of people,” much in line with the reasoning from a previous study on autistic religiosity: “Energies can never disappear, they can only be transformed … so where do our energies go?” (Visuri, 2012, p. 362). Shared cultural concepts thus appear to fill a central role in shaping the understanding of unusual bodily experiences.

**Feeling invisible touch**

The physical sensation of touch is yet another common theme, and these narratives further highlight the significance of relational aspects. Boyan, who labels herself Muslim, for instance describes the sensation of being pinched when she is alone. She interprets this bodily experience in terms of visits from a girl that she once knew in school:

I was lying on my couch sleeping, and then suddenly my toe was pinched. No one else was at home, a pinch like this (shows with her hand), properly. Like ouch! So it was my friend Cazandra, from the other side, who was spooking again and pinched my toe […] she wants me to talk to her and to visit her grave.

Boyan portrays these frequent experiences as rather undramatic, unless they occur during night time: “If nobody else is at home and someone pinches me, then I know that it’s her who is here, and it doesn’t matter as long as she doesn’t come night time. Because then it gets scary.” She is however pleased that her former friend still comes around, since she was important to her.
Other participants attribute their experiences to deceased animals, such as in Catzzy’s narrative about a beloved dog:

My aunt’s Rottweiler passed away a while ago and he was probably the sweetest dog there was. And then at one time at my former school I was kind of forced to watch a horror movie for the first time of my life and it wasn’t that fortunate, so to speak, and I was really really scared and then I felt when I was lying in my bed that there was something that kind of, I mean it wasn’t scary but it was more of a safe weight by the end of the bed, just like the dog used to lie when I was at my auntie’s … [It felt as if] he protected me or was just like a safe spot that I could turn to.

Sometimes she also senses the dog through her hands:

it has happened a few times that I have felt his fur against my hand even when I’m wearing thick gloves, so I know he’s somewhere around me. Not all the time but it’s like mostly when I feel insecure or scared or something like that.

This latter comment suggests that some of Catzzy’s somatosensory experiences occur during stress, and her interpretation appears to have a positive impact—similar to the cases in the previous section.

Lack of other plausible explanations also appears to trigger supernatural attributions. Catzzy describes another incident when she sits down to draw after school, while waiting for the rest of the family to arrive. Suddenly, she feels a hand on her shoulder:

I mean I jumped two metres up in the air! But now, thinking back, it could only have been [my great grandmother] because my great grandmother’s husband, I don’t remember him at all, I met him perhaps when I was two. And from what I know there was no one else in the family who died during that period of time.

Unable to find a physical agent in the room, Catzzy searches her mind for deceased relatives. In this process, temporal and relational aspects are activated: the closer relationship and the more recent passing makes the grandmother a plausible candidate.

Erik describes a similar process of temporal and relational attribution of agency. One night when his male cousin is staying over, he feels someone touching his back:

I was thinking that it’s only him trying to scare me and then I turned around and he was asleep, and I remember getting really scared. […] I don’t know, I didn’t really know anyone who had died so I didn’t know if it was like a ghost, I remember thinking that I had a budgie [who had died] a while before that […] I don’t know if I was thinking that that it was him who came and kind of poked me.

This somatic experience thus makes him look for an agent in the room, and when discovering that the only person close is asleep, he seeks for a recently deceased agent. Erik has previously described his sorrow at losing his pet, and this affection is likely significant in the process of ascription.

These narratives highlight how relational and temporal bonds are significant in attribution of invisible agency, much in line with Walter’s (1996) definition of grief as “the construction of a durable biography that enables the living to integrate the memory of the dead into their ongoing lives” (p. 7). Elements of distress are handled by ascribing presence of beloved ones, and cultural ideas on how beloved relations make themselves present after death again appear to be at play (cf. Day, 2013).

**Visions**

Contrary to the previous narratives, visual experiences often contain uncanny elements. In her early teens, Annie became deeply interested in ghost stories, and eventually started dreaming and hallucinating about these:

I saw a little girl sitting under a table, staring at me. […] I went to this website called “Scary for kids” and they were reading legends from Asia and Europe and some popular stories that are on the Internet right now. And then I kind of, I became that fascinated that I started having nightmares and felt more and more uncomfortable. I almost started hallucinating because I had a hard time sleeping and then I saw different … what is it called … visions?

While Annie does not think that the girl under the table really exists, it is significant that popular narratives are involved. Most of the visual accounts actually bear traits found in popular depictions
of the supernatural; Anastazia even explicitly describes an incident during an evening walk with her boyfriend as cinematic:

So we walked past [a car with foggy windows] and then when we were about a meter away from the car then we both saw, then the person sitting in the car turned around and looked at us and the face was … deformed. It was, the mouth was like a huge hole and the eyes too … like in a scary movie.

Boyan likewise describes her deceased friend as dressed in white when walking through her house, similar to the woman that Edgar once sights hanging from a tree. Edgar also tells of period when he sees shaggy dogs with red eyes roaming about—much resembling the otherworldly Celtic Cu Sí hound (see Daimler, 2017)—and even feels their sharp, bushy fur against his skin. He is uncertain whether the dogs appeared as a premonition before a distressing fight with his father, or if they occurred soon after the row: “I don’t know if those dogs were like a warning that I was going to be really angry, or some other kind of signal. I don’t know.”

While this narrative illustrates teleological thinking, Edgar also describes how he continuously searches for rational findings. This is for instance illustrated in the following account, when he suddenly sees a hand against the misty glass wall during a shower:

All human hands, when you take water and do like this [presses his hand against an imaginary wall], then there’s always space between the joints, but these weren’t there, it was the whole hand. A full mark. So that was a little weird. And then I got a little scared, because I’m not that happy about having ghosts in my house [laughs]. And there was no one who had died, so I don’t know. It only happened once.

Since the pattern of the hand does not seem natural, he searches for a recently deceased agent to make sense of what he sees. When no familiar agent is identified, the experience appears to become more frightening. Edgar later comments, in relation to another experience, that the unexplainable becomes less scary when attributed to God, whom he expects to be benevolent: "let me put it this way: it makes me calm to think that it’s God. Otherwise I would panic!"

It could be expected that fearful experiences like these are unwanted, but the participants often express that there is excitement involved. Anastazia for instance responds that she would not want the spirits to disappear from her house: “on the one hand it might be good, but then I would probably want to get this little adrenaline kick when something happens back, and then I wouldn’t know how to get it back.” Also David, who has experienced several unexplainable and sometimes frightening incidents, concludes that secular life views seem too dull for him: “I don’t want to become one of those boring atheists who’s sitting there with his theory of evolution.”

It is also noteworthy that few embodied attributions relate to God, not even in participants from families where there is religious practice. Anastazia, who labels herself Catholic, even directs her prayers to deceased relations: “I mean, I have a feeling that someone is listening [to my prayers] but I don’t think it’s Jesus so to speak […] it might be more like I feel the presence of my friends or relatives.” This issue of selections will be addressed further in the discussion below.

Before closing the empirical section, a final contextual finding needs to be addressed. Asking the participants whom they talk to about their experiences, most of them respond that they keep these to themselves to avoid negative reactions. Classmates have called Edgar an idiot for identifying as religious, and his parents worried that he might be psychotic when seeing black dogs. Mina similarly describes that some people in school think that he is crazy; Anastazia struggles to find logical arguments when discussing her experiences with friends; John compares prejudiced notions of Christians with segregation and racism; Boyan’s boyfriend disapproves of her watching occult reality TV; Erik’s father and sister argue that his religious worldview is nonsensical; and David describes being bullied as a child for his interest in magic:

I have sacrificed a lot for my interest in the supernatural, in the magical, in the religious, in the spiritual, to try to fit it. […] The atheistic perspective is so strong in this intellectual and political sphere so it’s kind of, you have to fight and I can’t find anywhere to settle down because the ground is contaminated with so much hatred.
Andrew additionally portrays how a sense of autistic otherness makes it even harder to “come out” as religious: if you are already autistic and also believe in unicorns, you will most certainly be labeled as odd. Silence also appears to be common; several participants say that this is the first occasion for talking about supernatural experiences, since no one else has ever asked.

Some scholars question to what extent there is a decline of religiousness in Europe, and argue that Swedes generally are indifferent to the role of religion (Hamberg, 2015; Stark & Finke, 2000). These young adults however describe strong secular and anti-religious reactions that make them keep quiet about their beliefs and experiences. The influence of secularity thus comes through as significant in relation to religious cognition.

**Discussion**

The first hypothesis generated from the material concerns the selection of appraisals. The participants preferably ascribe agency to invisible agents that are found outside organized religions; a choice which may be explained by the media in which young, Swedish adults encounter supernatural ideas. Partridge (2004–2005) has coined the term *occulture* to describe how esoteric content, which is embedded in the storylines of popular media, has boosted the interest in paranormal ideas such as magic, witchcraft, and reincarnation. Hanegraaff similarly illustrates how the “decline of the ‘grand narratives’ of Christianity and modernity towards the end of the 20th century has caused a new degree of openness towards what used to be minority options in the domain of religion or spirituality” (2015, p. 71), and thus esoteric ideas have gained wider acceptance.

As representatives of Western young adults from generation Y (born 1990–early twenty-first century), who commonly consume a vast amount of popular media (cf. Duppils, 2013), the participants bring forth fantasy literature, fantastic movies, computer games, TV-programmes and websites (e.g., Harry Potter, Transformers, Elder Scrolls, Scary for kids and occult reality-TV), as well as apps and board games that are used to detect paranormal activity (e.g., Ghost radar and Ouija boards). Esoteric models thus become integrated into their cognitive schemas. In other words, this study illustrates how cultural and generational specifics come into play in the attribution of supernatural agency. While Luhrmann’s (2012) American evangelicals learn to attribute bodily experiences to God, these Swedes live in a secularized society where God is rarely mentioned. Ghosts are however presented as active agents (Visuri, 2018a), and Day (2013) notes that a third of her British participants—including those who label themselves atheist—understand embodied experiences in terms of visits from dead.

Moving to the second hypothesis, it is here suggested that unusual somatosensory experiences are frequent among (a subset of) individuals on the autism spectrum. It is noteworthy that 14 out of 17 participants responded that they have had at least one somatosensory experience that is labeled in supernatural terms, and such experiences are much more common compared to the matched non-autistic group. These experiences come through as persuasive, and may be key to why the participants embrace supernatural models for understanding the world, despite the secular norms that they encounter.

The historical conceptualization of autism sheds further light on the role of anomalous experiences (e.g., “hallucinations”). Evans (2013) illustrates how early descriptions of “childhood schizophrenia” (later reconceptualised as “autism”; see Wing & Gould, 1979) were altered along with a quantitative turn in the 1960s, in which psychoanalytic case studies were exchanged for epidemiological models. This altogether changed the description of autism: “Whereas ‘autism’ in the 1950s referred to excessive hallucinations and fantasy in infants, ‘autism’ in the 1970s referred to a complete lack of an unconscious symbolic life” (Evans, 2013, p. 4). Absence of hallucinations was even made a criterion of infantile autism in the DSM III (APA), possibly in order to distinguish autism from schizophrenia. Along with the new cognitive norm, autism was instead framed as a communicative disorder.

The collection of emerging studies however indicates that unusual somatosensory experiences are common. Van Schalkwyk, Peluso, Qayyum, McPartland, and Volkmar (2015) for instance describe
five autistic cases where auditory illusions, obsession in magic and paranormal literature, and imaginary friends were misdiagnosed as psychosis. Another four cases are presented by Dossetor (2007), confirming that imaginary friends and anthropomorphic ideas about objects do manifest within the autistic framework. From the studies conducted so far, this prevalence appears to be higher than the estimated 5–30% in the general population (see Mitchell et al., 2017), but the varied distribution in this study suggests that unusual somatosensory experiences cannot be generalized across all autistic individuals.

The aspect of distress is also relevant. Luhrmann (2001) argues that cultural interpretations may shape social understandings of anomalous events and reduce stigma. While a majority of the participants in Milne et al. (2017) report that anomalous experiences are experienced as distressing, participants in the current sample appear to use supernatural attributions as a coping mechanism. Ascriptions of supernatural specialness (e.g., being psychic, having an ability for extrasensory perception) emerge as a salutogenic alternative to the psychiatric language.

Lastly, Hammer argues that a yearning for enchantment motivates people to embrace supernatural ideas: “For the believer, such phenomena point to the fact that the world is more obscure, grand and magical than what science tells us” (1998, p. 295). Enchantment quite rightly comes through as an emotional trigger and key aspect in choice of attributions: the participants appear to find ghosts more interesting than gods. Experiences are also described in affirmative terms; even those that trigger fright and adrenaline are described as thrilling, rather than troublesome. In other words, the participants wish for the world to be enchanted, and bodily experiences reinforce this notion. Embodied, embained and encultured structures are accordingly entwined into a web of magic.

Methodological considerations and suggestions for future research

First, this study offers two hypotheses that invite validation through testing in larger samples. The first hypothesis on how Western secularization and occulture affects the process of attributions would benefit from cross-cultural examination of how ascriptions are embedded in various contexts. The second hypothesis concerning the propensity for unusual somatosensory experiences on the autism spectrum would also gain strength from larger samples and different cohorts, to examine generalization towards a whole population, and explore prevalence in possible subgroups.

Second, insider narratives challenge the description of autism. Contrary to previous expectations (e.g., Barrett, 2012; Bering, 2002; McCauley, 2011; Tremlin, 2006), these autistic individuals describe the significance of supernatural and existential issues. Subjective perspectives are rarely captured through scales and experiments, and valuable insights may be lost through methods that are not adapted to autistic prerequisites (Visuri, 2018b). Collaborative research involving autistic individuals is therefore necessary to access significant nuances.

Third, further questions are raised about the role of intuitive mentalizing in underpinning supernatural beliefs. These participants, who generally struggle with social relations, describe religiosity as a process that is moulded from prelinguistic, bodily experiences, which gradually are formed into supernatural ideas. While scales tend to capture socially desirable responses (Visuri, 2018b), experimental designs and culturally sensitive measures could potentially contribute with insights on the cognitive development of religiosity. Importantly, “religion” must be conceptually stretched beyond mental (and Protestant) concepts such as “beliefs,” to also include embodied and lived experiences, to capture a wider array of expressions. Ultimately, the questions we pose define what responses we get.

Yet another interesting possibility relates to developmental aspects of religious representation. Gregory and Greenway (2017) found that young people appear to recall counterintuitive representations more frequently than older individuals. The study presented here does not reveal whether older individuals on the autism spectrum would be less prone to represent their experiences in supernatural terms, which calls for future studies to involve participants of different age.
Lastly, the study highlights the benefit of studying complex phenomena—such as autism and religiosity—through interdisciplinary designs. While quantitative methods mainly overlook subjective perspectives (e.g., sense-making), comparisons of experiences between groups would have been lost with a solely qualitative design. Importantly, the triangulation of data reinforces the results from each of the methods, and highlights various aspects of the same phenomenon. Like the different lenses in a kaleidoscope, different scientific and epistemological viewpoints help us advance towards a fuller picture of autism, religiosity, and autistic religiosity.

Conclusions

This multi-method study highlights unique aspects in the process of supernatural attributions in Swedish young adults who are diagnosed on the autism spectrum. In comparison to the matched, non-autistic sample, they report many more unusual somatosensory experiences that they label in supernatural terms, such as sensing invisible presence, feeling invisible touch, and seeing things that others cannot see. It is therefore suggested that somatosensory experiences that occur without external stimuli are more prevalent in autistic individuals. Despite the fact that these also appear in the typical population, it is argued that atypical sensory processing in autism is related to the generation of such embodied experiences.

Attribution of supernatural agency is here understood as a strategy for making sense of odd experiences, which may otherwise be distressing. It is moreover proposed that the upswing of esoteric elements in popular culture is central for understanding why these young Swedes mainly attribute agency to ghosts, spirits and ancestors when seeking to make sense of unusual experiences. Enchanted ideas from popular media appear to be more persuasive than organized religiosity for this younger generation of adults, and embodied experiences here form a pathway to a supernatural understanding of the world.

In conclusion, these findings contribute to a broader understanding of religious cognition in autism. By involving autistic participants as collaborators, the study contributes unique narratives and insights from inside the autism spectrum, and the incorporation of embodied and culturally embedded aspects of cognition challenges previous assumptions that autistic individuals would fail to represent superhuman agency. The scientific kaleidoscope has many lenses, and by studying autism from several angles and through various methods, we are able to see interesting complexities. Ultimately, embodied, embained and encultured processes are closely intertwined, and together these contribute to forming the enchanted understanding that these participants hold of the world.

Notes

1. The term Asperger’s syndrome was used in the previous diagnostic manual (DSM IV) to describe autistic individuals with normal to high IQ and typically developed verbal ability. In this article, the newer term high functioning autism spectrum disorder (HFA; APA, 2013) is used for all participants.
2. In one of very few studies on sensory atypicalities in the general population, Little, Dean, Tomchek, and Dunn (2017) find that 88.6% of typically developing children fulfill the criteria for “balanced sensory profile,” compared to 35.1% of the autistic children. Some caution is recommended when comparing with results on autistic samples, due to age differences.
3. Milne et al. (2017) note that auditory and visual sensitivity is unsatisfactory for explaining this occurrence, since experiences do not relate to external stimuli. In line with Horder et al. (2014), they suggest that alterations in perceptual experience may be caused by imbalance in neural excitation and inhibition, related to signalling in the GABA neurotransmitter.
4. The full Kendal questionnaire is based on Glock and Stark’s (1965) five-dimensional concept of religiosity: ideology/belief, experience, ritual practice, knowledge and consequences, and both evaluates elements related to organized religion (e.g., prayer response and the experience of divine presence in consecrated spaces) and esoteric elements (e.g., near-death experience and felt presence of a spirit).
5. Since the autistic participants were more meticulous in filling in questionnaires, making an effort to give as correct responses as possible, they needed more time than the participants in the comparison group. This and other methodological insights are described further in Visuri (2018b).
6. The participants in the comparison group were not interviewed, since qualitative comparisons are both time consuming and complicated to analyse comparatively.

7. Translations from Swedish to English were made by the researcher.

8. Several individuals appear to have assumed that “near death experience” means that one was almost killed in an accident. Since such misinterpretations make the data invalid, the item was removed from the results.

9. The term “hallucinations” has been avoided in this article, since it implies that experiences are false. Since this study solely aims at understanding the process of attributions and autistic experiences, such ontological positioning is irrelevant.

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