

Continuity and Credibility in the Cognitive Science of Religion

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McCauley and Graham’s (hereafter M&G’s) *Hearing Voices and Other Matters of the Mind* is a tour de force of careful, reasoned analysis. In this commentary we have two objectives. First, we offer some remarks – and ask for some clarifications – about the continuity approach at the book’s heart. Then we zoom in and put a specific hypothesis that M&G defend – the mindblind atheism hypothesis – under the microscope. There we focus not so much on M&G’s theoretical treatment as on the underlying empirical research. In doing so we hope to make a broader point: Any theoretical work – however rigorous – based on empirical research is ultimately only as credible as the research it is based upon – and recent developments in psychological science have changed the credibility landscape considerably.

M&G’s Continuity Approach

M&G’s overarching aim is to explain a continuity between mental disorders and religiosity.¹ They begin by situating this focal continuity in a broader framework of three salient cognitive continuities (see Figure 1): the second being a continuity between everyday experiences and beliefs, on the one hand, and psychiatric symptoms on the other; and the third being a continuity between religious cognition and everyday cognition. We think this general framework holds great promise for conceptualising phenomena at the interface of religion and mental illness, but some further clarification and development of the scheme could be useful.

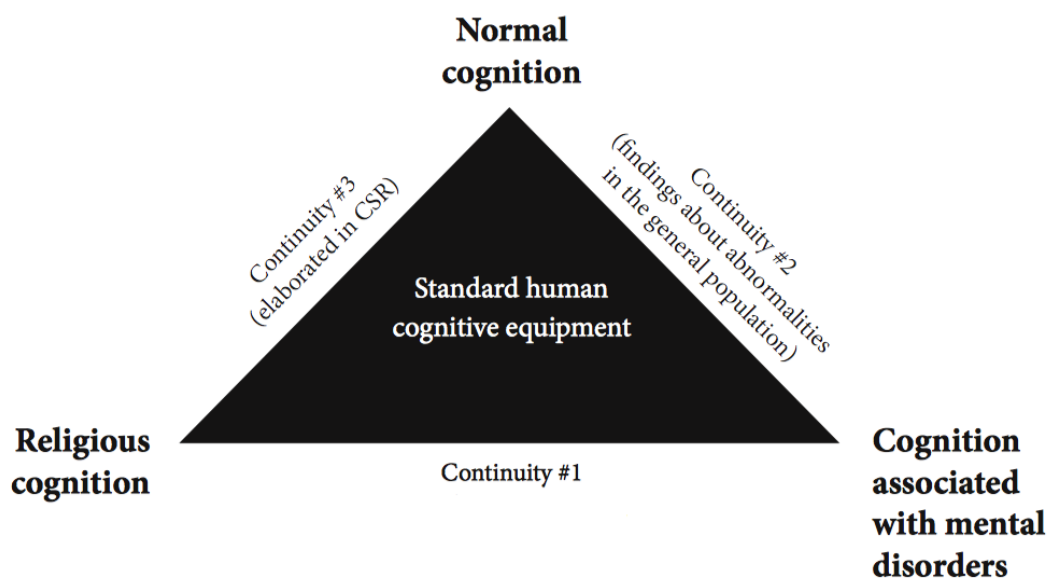


Figure 1: McCauley and Graham outline three continuities in cognition (© Oxford University Press 2020, reproduced with permission of the Licensor through PLSclear; CSR = the Cognitive Science of Religion).

It seems to us that there are two salient dimensions in this scheme: a dimension of religiosity (people can be more or less religious) and a dimension of psychological health (people vary in the extent to which they display symptoms of mental disorders). We’re unsure whether M&G’s scheme implies that these two continua are (a) related, such that people who are more religious are less (or perhaps more) likely to display symptoms of mental illness; or (b) orthogonal, in which case there is no such relationship. M&G’s first, and focal, continuity (Continuity # 1 in

¹ Reflecting the analytic rigour they bring to the subject, M&G’s actual statement of this aim is more qualified and nuanced than this: “Our aim in this book is to advance a program of cognitive analysis and research that will make some headway in explaining [a continuity]... between features of experiences and behaviours associated with particular mental disorders and features of experiences and behaviours associated with religiosity (pp. 3-4)”.

Figure 1) suggests the former: that is, it seems to imply that a person cannot be both devoutly religious and mentally disordered, because approaching one pole of the continuum entails moving away from the other.

As it happens, the notion that religiosity and mental disorder are mutually exclusive is somewhat consistent with the dominant psychiatric conception of delusion (McKay & Ross, 2021). Indeed, the world's largest psychiatric organisation defines delusions in such a way as to exclude "article[s] of religious faith" (APA, 2013, p. 819).² However, though M&G underscore the importance of cultural considerations in attributions of mental disorder, we don't think they mean to suggest that religion and mental disorder are generally opposing. On the contrary, they emphasise that, "Many religious experiences share telling features with the experiences of people with various mental disorders" (p. 29).

So, what, exactly, do M&G mean by "continuity"? At some points they seem to mean that there is no clear boundary between the two concepts in question: "no profound ruptures separate the underlying cognitive systems... no bright line demarcates the two categories" (p. 6). This is perhaps not quite the same as a *continuum*, where there is likewise no "profound rupture" between adjacent elements but where the extremes are nevertheless quite distinct. But M&G's second continuity – that between the experiences and beliefs of healthy individuals and psychiatric patients – is often presented as a continuum (DeRosse & Karlsgodt, 2015; van Os, Linscott, Myin-Germeys, Delespaul, & Krabbendam, 2009; c.f. David, 2010). Accordingly, we would be grateful for some clarification of (a) what M&G see a continuity between mental disorders and religiosity as consisting in; and (b) what this conception implies about the relationship between these classes of phenomena (e.g., does it imply a correlation between religiosity and mental illness? Does it imply a *causal* relationship?).

One possibility is that M&G's overarching continuity scheme subsumes a cluster of individual continuities – and potential causal relationships – between different facets of religiosity and different mental disorders; in which case general answers to our questions above may not be forthcoming. One specific hypothesis that M&G discuss and defend that does imply a causal relationship between a particular mental disorder and belief in God (or lack thereof) is the mindblind atheism hypothesis. Below we examine the evidence for this hypothesis (which M&G consider "supportive", if not "univocal") in some detail. But first we provide some broader context for this investigation.

The Mote and the Beam: Assessing the Credibility of Empirical Research in the CSR

We should embrace disclosure and preregistration as if the credibility of our profession depends on it. Because it does.

~ Simmons, Nelson, and Simonsohn (2018)

And why beholdest thou the mote that is in thy brother's eye, but considerest not the beam that is in thine own eye?

~ Matthew 7:3

The 2010s was a decade of crisis for psychological science. During this time, researchers were made aware that undisclosed flexibility in data collection and analysis can dramatically increase the likelihood of false positive findings (Simmons, Nelson, & Simonsohn, 2011) and

² M&G refer to this religious exemption as "popularity exceptionalism" (p. 8; see also Graham, 2015).

that psychological studies fail to replicate at a much higher rate than would be expected (Camerer et al., 2018; Collaboration, 2015). In response to this crisis, a movement has coalesced around adopting methodological reforms to make psychological research more credible (Munafò et al., 2017; Nelson, Simmons, & Simonsohn, 2018; Nosek et al., 2021). Among the most important of these reforms has been a focus on “pre-registration” of studies so that the plan for data collection and analysis is specified and time-stamped before data collection begins.

The cognitive science of religion (CSR) manifests credibility concerns that mirror those of the broader psychology literature (Charles, Bartlett, Messick, Coleman III, & Uzdavines, 2019; Hoogeveen & van Elk, 2021; Kavanagh & Kapitany, 2021). As we are keen to avoid pointing the finger at others while ignoring our own responsibility, in discussing these issues we acknowledge how our research manifests some of the very same shortcomings that we highlight (the beams in our own eyes).

Consider the example of what is, arguably, the most widely studied hypothesis in the CSR: that activating religious concepts via subtle “religious priming” has a measurable influence on attitudes and behavior. The authors of a meta-analysis of 93 religious priming experiments (encompassing 11,653 participants) concluded that “religious priming has robust effects across a variety of outcome measures” (Shariff, Willard, Andersen, & Norenzayan, 2016, p. 27). However, this conclusion may be premature. As none of the studies appearing in this meta-analysis – including two co-authored by one of us (RMcK) – were pre-registered, the rate of false positives may be substantially inflated (Simmons et al., 2011). van Elk et al. (2015) presented two alternative meta-analyses of the religious priming literature with contrasting conclusions, and argued that pre-registered replications are a crucial remedy for biases in the religious priming literature.³ Several years after these competing meta-analyses were published there is still no consensus about whether religious priming effects are replicable (Watanabe & Laurent, 2021).

MindBlind Atheism: Assessing the Evidence

A key lesson from this brief foray into the religious priming debate is that considerable caution is warranted when interpreting and synthesizing empirical research from the CSR – as with research from the psychological sciences more generally. Our commentary is not the place to attempt a broad evaluation of the credibility of all quantitative research that M&G discuss in their book. Instead, we decided to assign ourselves a single case-study and (somewhat arbitrarily) cast our gaze on the “mindblind atheism” hypothesis presented in chapter 5. As noted by M&G, this hypothesis builds on the “mindblindness” theory of autism – which argues that theory of mind deficits are a core feature of autism (Baron-Cohen, 1995)⁴ – to make the novel prediction that mentalizing deficits associated with autism constrain belief in a personal god (Norenzayan & Gervais, 2013). M&G consider four studies that test this hypothesis by

³ Note that, just as undisclosed analytic flexibility is a problem at the level of individual studies, so can undisclosed *meta*-analytic flexibility bias conclusions about the state of a whole field (de Vrieze, 2018; Quintana, 2015) – so there is value in pre-registering meta-analytic decisions. We emphasise however that we have ourselves published non-pre-registered meta-analyses.

⁴ The “mindblind” theory of autism is controversial. First, it has been argued that the “mindblindness” metaphor is harmful because it impedes scientific understanding and carries strong negative connotations (Dinishak & Akhtar, 2013). Second, the empirical evidence that autism is associated with a specific and universal deficit in theory of mind is contested, and many studies that have been used to support this hypothesis have small samples, are not pre-registered, and fail to replicate (Gernsbacher & Yergeau, 2019). While we are very sympathetic to these concerns, for clarity of exposition we use the term “mindblind” here.

comparing autistics⁵ to neurotypicals: Caldwell-Harris, Murphy, Velazquez, and McNamara, (2011); Ekblad and Oviedo (2017); Norenzayan, Gervais, & Trzesniewski (2012); and Reddish, Tok, and Kundt (2016). In addition, we identify a fifth highly relevant study that M&G do not discuss: Maj et al. (2017).⁶ Below we evaluate the support these studies supply for the “mindblind atheism” hypothesis.

The first thing to note is that none of these studies were pre-registered, which immediately raises concerns about replicability (we hasten to add that most of our own published research is, likewise, non-pre-registered, and thus vulnerable to exactly the same criticism). We do not know whether M&G took pre-registration (or lack thereof) into account when evaluating the credibility of studies like these; they do not discuss pre-registration, but this could simply reflect how little of the relevant research has been pre-registered.⁷ However, we think it is worth explicitly highlighting this lacuna. We move now to consider other details of these studies.

First, Study 2 of Caldwell-Harris et al. (2011). This was an online study of 61 autistics and 105 neurotypicals. Laudably, as M&G note, the authors framed this research as “exploratory, rather than hypothesis-driven” p. 3362) because the hypotheses were not developed prior to data collection. For present purposes, the most important of these exploratory analyses was the finding that autistics were more likely than neurotypicals to indicate that they were atheist rather than religiously affiliated. While this finding is certainly consistent with an association between autism and atheism, the study has three important limitations. First, the autistic participants were recruited anonymously online and participated online. This could be problematic given evidence that some participants in online studies lie about having clinical conditions and that this deception can have a significant impact on research findings (Chandler & Paolacci, 2017; Chandler, Sisso, & Shapiro, 2020). Second, even if all participants in the autistic group honestly believed that they were autistic, they might not all have met the relevant diagnostic criteria. Autistic participants in this study were asked who had performed the diagnosis: only 62% indicated that they had been diagnosed by a clinician, with another 13% relying on self-diagnosis, and 24% skipping this question (Catherine L. Caldwell-Harris, pers. com. 21 Jan 2021). Third, the autistic and neurotypical participants were recruited in entirely different ways: the autistic group was recruited via advertisements on an autism-rights webpage, while the neurotypical group was a convenience sample recruited at an American university. As these groups were not demographically matched, they may have varied on dimensions that are strongly predictive of religious belief, such as religious exposure during childhood, culture, and socioeconomic status. For these three reasons, we suggest that this study provides only circumstantial evidence for the mindblind atheism hypothesis.

Second, Study 1 of Norenzayan et al. (2012). This was a lab-based study of 12 autistic and 13 neurotypical adolescents that were matched in terms of age, gender, ethnicity, parents’ religious affiliation, and parents’ education. The core result was that a logistic regression model

⁵ A quick note on language: the majority of autism advocates prefer the term “autistic” to “person with autism” (Fletcher-Watson & Happe, 2019) so we use “autistic” here, while acknowledging that terms are contested. Furthermore, empirical research we summarize typically recruits participants diagnosed with an Autism Spectrum Disorder (ASD), including diagnoses such as Asperger’s syndrome, and treats them as a group. For ease of exposition, we simply refer to all such participants as “autistic”.

⁶ For the purposes of this commentary, we ignore studies that focus on attitudes directed at God and qualitative research.

⁷ Likewise, our own recently published review of the relationship between religion and delusions (McKay & Ross, 2021) never mentioned the issue of pre-registration. As virtually none of the research on this topic was pre-registered, we instead focused on studies that we felt had other indicators of credibility, such as large sample sizes.

revealed that neurotypical participants were more likely than autistic participants to be in a high belief in God group than in a low belief in God group when controlling for IQ. A clear advantage of this study over the study by Caldwell-Harris et al. (2011) is that the participant-matching addressed the issue of potentially important confounds. Nevertheless, this study is limited because of its small sample size and the fact that the result was only just statistically significant ($p = .046$). Moreover, the authors' analytical approach (using median split to dichotomize their belief in God variable for the purposes of analysis rather than treating it as a continuous variable) is questionable (MacCallum, Zhang, Preacher, & Rucker, 2002).⁸ Because of these limitations, we suggest that this study provides only tentative evidence in support of the mindblind atheism hypothesis.

Third, the study of Reddish et al. (2016). This lab-based study included 19 autistic and 19 neurotypical adolescents who were matched in terms of gender, age, developmental quotient (a numerical indicator of a child's development across a range of psychosocial competencies), and religious identity. An analysis of covariance (with religious upbringing as a covariate) found no difference between autistics and neurotypicals in terms of strength of religious belief. We did not identify any specific limitations in this study (other than the small sample size and lack of pre-registration, which are common to all of these studies).

Fourth, Study 1 of Ekblad and Oviedo (2017). This online study included 128 participants who reported a clinical diagnosis of autism, 678 participants who self-identified as having autistic traits, and 1332 participants who didn't identify as being on the autism spectrum. From a series of 43 religion-related questions the authors identified eight factors, of which the spirituality and confessional factors are most relevant here. For both of these factors people who self-identified as on the spectrum had the highest mean scores, followed by those with an autism diagnosis, followed by those who did not identify as being on the spectrum, with the omnibus ANOVA being statistically significant in both cases ($p < .001$). While this study provides results that point in the opposite direction to that predicted by the mindblind atheism hypothesis, these results, like those of Caldwell-Harris et al. (2011), are difficult to interpret because participants were recruited online, autism diagnoses were not verified, and demographics were not matched across groups.

Fifth, Study 5 of Maij et al. (2017). This lab-based study included 33 autistic and 30 neurotypical adolescents matched in terms of age. This study did not find that groups differed in terms of religiosity. A limitation of this study is that religiosity levels in the neurotypical group were low (the study was conducted in the Netherlands, a very secular country), meaning that there may have been limited scope for autistic participants to manifest *even lower* levels of religiosity.

As we have seen, of the studies we have discussed, two reported a negative association between autism and religiosity; one reported a positive association between autism and religiosity; and two did not find any association between autism and religiosity. Given that all these studies had small sample sizes (and, thus, are likely to be underpowered for detecting effect sizes typical of psychology research), none were pre-registered, and four had other important limitations, these mixed results are very difficult to interpret. Consequently, we suggest that, considered as a whole, these five studies provide no evidence for (or against) mindblind atheism in autism. M&G also examined *indirect* evidence for the mindblind atheism hypothesis: in particular, studies which reported a relationship between autistic traits and low

⁸ A questionable analytical decision that one of us (RMcK) has made in his own research.

levels of belief in God in the general population. However, while we cannot address this indirect evidence in detail here, we briefly note that we do not find this evidence convincing either. Once again, a key limitation of all the studies they cited is that none of them were pre-registered. Moreover, a series of four studies that were not cited (Maij et al., 2017) failed to find evidence for the predicted association, despite having large (and, in one case, extraordinarily large) samples ($n = 65,561, 588, 604, \text{ and } 797$).

Conclusion: To Be Continued...

The interface between mental disorders and religiosity is famously fraught theoretical territory. M&G carefully navigate the myriad conceptual complexities, while acknowledging that these are “only multiplied by the many alternative means available for the measurement of [the phenomena in question]” (p. 209). In this commentary we have sought to highlight a further layer of complexity – a layer brought into sharp relief by the replication crisis that has engulfed psychological science in the past decade. Happily, reforms that increase the credibility of research in the CSR are beginning to be adopted, including preregistration. However, to date, the vast majority of studies in the field – our own included – have not been pre-registered, which means that the false positive rate could be dramatically higher than statistical analyses suggest (Simmons et al., 2011). Consequently, the credibility of the current literature is difficult to evaluate. Though M&G provide a much richer exploration of relationships between autism and religiosity, we have argued that the evidence for one specific continuity hypothesis they defend – the mindblind atheism hypothesis – is quite tenuous, at least when we focus on direct evidence comparing belief in God in autistics and neurotypicals. Future pre-registered studies – and pre-registered meta-analyses thereof – will shed more light on this and other candidate cases of cognitive continuity.

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