



Development and validation of the multi-dimensional questionnaire of scientifically unsubstantiated beliefs

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ABSTRACT

Objective: There are several existing questionnaires measuring paranormal or scientifically unsubstantiated beliefs but none give comprehensive cover of a broad spectrum of beliefs while also being up-to-date. There is also a debate about the number of separate types of belief. Thereby, reported here is the development and validation of a new multidimensional questionnaire measure of scientifically unsubstantiated beliefs in the general UK population.

Method & results: In Study 1, participants ($N = 393$) completed a questionnaire containing a pool of 82 items covering nine facets of belief discernible conceptually within the existing research literature. Scree analysis followed by exploratory factor analysis indicated the existence of four empirically observable factors: belief in supernatural forces; belief in God and destiny; belief in alien visitation, monsters and conspiracies; and belief in consciousness beyond the body. Twenty-four items were selected as measures of these factors. Studies 2, 3 and 4 demonstrated the convergent and divergent validity of the four empirically-derived questionnaire subscales and their internal reliability.

Conclusion: The resultant new Multi-dimensional Questionnaire of Scientifically Unsubstantiated Beliefs (MQSUB) is a psychometrically robust measure and comprises a comprehensive framework which can be used to systematically investigate the psychological and social concomitants of such beliefs.

1. Introduction

Belief in scientifically unsubstantiated phenomena is widespread throughout the world. For example, Moore (2005) observed that around three-quarters of the adult American population accept at least one paranormal belief (for example, ghosts, telepathy, precognition, astrology) while Austin (2005) reported that 68% of adult British society reported having experienced some kind of supernatural event, including 31% claiming to have experienced the presence of a ghost. Brotherton, French, and Pickering (2013) reported moderate levels of conspiracist ideation in their series of studies. Despite the prevalence of belief in scientifically unsubstantiated phenomena there is currently no comprehensive and up-to-date measure available for researchers. The studies reported here document the development and validation of a comprehensive and multi-dimensional measure of scientifically unsubstantiated belief to assist research examining the causes and consequences of such belief.

The term *paranormal* is defined as ‘a proposition that has not been empirically attested to the standards of the scientific establishment but

is generated within the non-scientific community and extensively endorsed by people who might normally be expected by their society to be capable of rational thought and reality testing’ (Irwin, 2009, p16). This definition emphasises the lack of empirical evidence for a belief and so might include those in conspiracy theories and religious belief, though these are not typically regarded as facets of the paranormal. The present series of studies uses the term ‘scientifically unsubstantiated phenomena’ as a generic one to encompass a wider field than is commonly understood by the word ‘paranormal’.

Belief in scientifically unsubstantiated phenomena may seem harmless but can have damaging impacts on personal outcomes and on wider society. For example, a tendency to conspiracist thinking is associated with non-compliance with health care for HIV/AIDS (Bogart, Wagner, Galvan, & Banks, 2010), and a withdrawal from cooperation with security measures (Bartlett & Miller, 2010). Belief in alternative medicine can lead to inappropriate health behaviours (Perry & Dowrick, 2000; White, Resch, & Ernst, 1997), while belief in demonic possession can result in violence against individuals perceived to be afflicted (<http://www.livescience.com/37274-toddler-exorcism-death>.

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html). Generally, belief in scientifically unsubstantiated phenomena discourages appreciation of evidence, thereby harming an individual's ability to assess current threats and concerns, or to evaluate the importance of initiatives such as testing for cancer in at-risk groups (French & Stone, 2014, p171; Sherriff, 2010). This may be of concern in politicians who take decisions with far-reaching consequences, such as whether to fund renewable energy sources or homeopathy delivered through a national health service.

There are several questionnaire measures of paranormal belief, the two most used being the Revised Paranormal Belief Scale (RPBS) originally developed by Tobacyk (1988), and the Australian Sheep and Goat Scale (ASGS) of Thalbourne and Delin (1993). Both of these have substantial limitations.

The RPBS is the most frequently-used measure of paranormal belief according to Irwin (2009, p45). It purports to measure belief in seven facets of the paranormal: traditional religious belief, psi, witchcraft, superstition, spiritualism, extraordinary life forms, and precognition. This measure has been valuable in establishing the multi-dimensionality of paranormal belief and has produced a substantial body of research. A major drawback is that its 26 items are insufficient to measure the seven facets reliably, since there have been frequent failures to replicate the factor structure: some researchers consider there are five factors (Lawrence, Roe, & Williams, 1997, 1998), while Lange, Irwin, and Houran (2000) preferred two clusters of items which they termed New-Age Philosophy (psi and psychic powers, future prediction, astral projection) and Traditional Paranormal Belief (witchcraft and the devil). Some items are outdated, for example, the statement 'witches do exist' could be argued to be true since people who follow the practice of Wicca call themselves witches. The item 'There is life on other planets' is now scientifically supported and accepted as the case. The items in the traditional religious belief scale are Judeo-Christian in nature and do not address the full spectrum of traditional religious beliefs commonplace in many countries today.

The ASGS is so-named to refer to those who believe in the paranormal as 'sheep' and those who are sceptical as 'goats'. The ASGS contains eighteen items measuring belief and self-rated abilities in, telepathy, psychokinesis (movement of objects by the power of the mind), precognition, and post-mortem survival. Its scope, however, does not cover the full range of popular paranormal belief.

Other measures are focused on a narrow range of belief: for example, the Generic Conspiracist Belief Scale (Brotherton et al., 2013) measures general conspiracist ideation, the tendency to endorse conspiracy theories across a range of domains. Its scope is thus limited to one specific facet of scientifically unsubstantiated belief.

None of these existing measures cover the whole range of common beliefs in scientifically unsubstantiated phenomena. The present study aimed to identify the conceptually and empirically discriminable components of scientifically unsubstantiated belief and to create a multi-dimensional questionnaire measuring belief across a wide range of topics of current concern and using items that are well-understood by the general population. In Study 1, participants were presented with 82 questions covering a wide range of beliefs including the seven facets of the RPBS and additionally belief in conspiracy theories, religion, destiny/fate/karma, and alternative medicine.

Subsequent studies reported here investigated the convergent and divergent validity of the relevant subscales of the new questionnaire compared to existing measures. Convergent validity was measured relative to the RPBS (Study 2), the Generic Conspiracist Belief Scale (Study 2), and the Australian Sheep-Goat Scale (Study 3 and 4). Divergent validity was measured by comparison with the Creative Experiences Questionnaire measure of fantasy proneness (Study 2), the Rational Experiential Inventory measure of thinking styles (Study 3), and locus of control (Study 4). In addition, Study 4 examined how mortality awareness, rebelliousness, and self-perceived marginalisation, relate to scientifically unsubstantiated beliefs.

2. Study 1

2.1. Participants

There were 393 participants recruited via social media. An opportunity sampling method was employed wherein the researchers used their electronic networks to elicit the input of respondents. Undergraduate students were approached via email, as well as individuals in social networks on Facebook and Instagram.

The participant sample comprised 280 women (71%), 112 men (28.5%), and 1 respondent who gave their gender as androgyne. Their ages ranged from 18 to 86 (with 80% being aged 18 to 48), mean age = 34.9 years, SD = 14.71. Of these participants, 131 (33%) were married, 29 (7.4%) were cohabiting, 190 (48%) were single, 18 (4.6%) were divorced, 6 (1.5%) were widowed and 19 (4.8%) were separated. Educationally, 73 (18.6%) had been educated to age 16 (UK General Certificate of Secondary Education), 85 (21.6%) to age 18 ('Advanced' secondary school level), and 234 (59.5%) had university or professional qualifications. There were 122 (31%) students (only 4 of whom self-designated as part-time), 20 (5%) were unemployed, 11 (2.8%) self-designated as home-makers, 210 (53%) were employed (153 full-time, 57 part-time), and 30 (7.6%) described themselves as retired. Household income was less than £5000 per year for 109 (28%) of the participants, over £45,000 for 30 (7.6%) of the participants, with the majority (50%) reporting between £11,000 and £30,000. A majority of respondents ($N = 310$, 79%) gave their ethnicity as 'white European', with the remainder spread among other ethnicities (for example, 6% as 'black African' and 6.6% as 'south Asian/Indian/Pakistani'). Religious affiliation was varied: 175 (44.5%) specified having no religion, 136 (34.6%) self-designated as Christian, 37 (9.4%) were Muslim, and 6 (1.5%) were Buddhist, while 35 (8.9%) gave their religion as 'other'. Thus, the participant sample covered a broad range of demographics. It should be noted that previous research has shown only weak and inconsistent variation in belief according to these factors (e.g., French & Stone, 2014, Chapter 2).

2.2. Measures

The initial pool of 82 items was created following an examination of existing questionnaire measures of paranormal and conspiracist belief (ASGS, Thalbourne & Delin, 1993; RPBS, Tobacyk, 1988; GCBS, Brotherton et al., 2013) and the a-priori consideration of other areas of belief, specifically belief in the influence of destiny/fate/karma and belief in the efficacy of alternative medicine. We took a deliberately inclusive approach in order to produce a wide-ranging measure, and this included items measuring religious belief. Nine conceptual domains of belief were identified: *anomalous mental powers* including clairvoyance, telepathy, precognition, and psychokinesis, an example of an item being 'some people can see events before they happen'; *traditional supernatural belief* including good and bad luck, dowsing, and casting spells, an exemplar item being 'touching wood can bring good luck'; *fate/destiny/karma*, e.g., 'some events are fated to occur'; *extraordinary life forms* including aliens, the Loch Ness monster, and Bigfoot, e.g., 'Aliens from other planets have visited Earth'; *the survival hypothesis* including reincarnation, ghosts, and astral travel, e.g., 'Some part of a person's consciousness can survive their death'; *future prediction*, e.g., 'Study of the stars can be used to predict the future for individuals'; *Energy-based therapies*, e.g., 'homeopathy is an effective form of medicine'; *religious beliefs*, e.g. 'The world was created by a God'; and *conspiracist beliefs*, e.g., 'National governments routinely lie to the general public in order to retain power'. For each of these nine conceptual domains of belief items were generated so that collectively the item pool comprised of 82 in all.

The 82 items were scored on a scale of 1–5, where 1 = strongly disagree, 2 = disagree, 3 = neither agree nor disagree, 4 = agree, and 5 = strongly agree.

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