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Psychics, aliens, or experience? Using the Anomalistic Belief Scale to examine the relationship between type of belief and probabilistic reasoning



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ABSTRACT

A growing body of research has shown people who hold anomalistic (e.g., paranormal) beliefs may differ from nonbelievers in their propensity to make probabilistic reasoning errors. The current study explored the relationship between these beliefs and performance through the development of a new measure of anomalistic belief, called the Anomalistic Belief Scale (ABS). One key feature of the ABS is that it includes a balance of both experiential and theoretical belief items. Another aim of the study was to use the ABS to investigate the relationship between belief and probabilistic reasoning errors on conjunction fallacy tasks. As expected, results showed there was a relationship between anomalistic belief and propensity to commit the conjunction fallacy. Importantly, regression analyses on the factors that make up the ABS showed that the relationship between anomalistic belief and probabilistic reasoning occurred only for beliefs about having experienced anomalistic phenomena, and not for theoretical anomalistic beliefs.

1. Introduction

Many people hold a variety of non-evidence based beliefs that, at least in some cases, directly contradict our current understanding of reality (Moore, 2005; Ross & Joshi, 1992). One such category is anomalistic beliefs, which typically refers to paranormal and related beliefs (e.g., psychics, telekinesis, etc.) but can also include other varieties of beliefs, such as extra-terrestrial visitation, the efficacy of homeopathy and reiki, and some conspiracy theories. Researchers have argued that one explanation for the existence of anomalistic beliefs is reasoning ability. Specifically, people in general make many types of reasoning errors and reach inaccurate conclusions (e.g., Johnson-Laird, Khemlani, & Goodwin, 2015; Stanovich & West, 2000; Wason, 1960), however, higher levels of anomalistic beliefs have been associated with poorer reasoning ability and stronger cognitive biases (Blackmore & Troscianko, 1985; Bressan, 2002; Tobacyk & Wilkinson, 1991; Wiseman & Watt, 2006). The focus of this article is on reasoning skills and biases associated with anomalistic belief and, in particular, the propensity to commit the conjunction fallacy. We chose to focus on the conjunction fallacy because it taps into several underlying heuristics that can bias decision making (e.g., availability and representativeness; Keren & Teigen, 2004; Tversky & Kahneman, 1983), and because previous work that has looked at it in relation to anomalistic beliefs has produced mixed results.

The conjunction fallacy occurs when someone assesses the likelihood of conjunctive conditions occurring (e.g., A + B) to be greater than either of those conditions occurring on their own (A alone or B alone). Judging the conjunctive conditions as more likely is a fallacy because the probability of multiple conditions co-occurring is always lower than (or, at most, equal to) the probability of

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one of those conditions occurring on its own (Tversky & Kahneman, 1983). Several studies have found a positive relationship between anomalistic belief and propensity to commit the conjunction fallacy (e.g., Brotherton & French, 2014; Dagnall, Drinkwater, Denovan, Parker, & Rowley, 2016b; Rogers, Davis, & Fisk, 2009; Rogers, Fisk, & Lowrie, 2016; Rogers, Fisk, & Wiltshire, 2011), however, other studies have failed to find this relationship (Dagnall, Drinkwater, Parker, & Rowley, 2014; Dagnall, Parker, & Munley, 2007). The aim of the current study was to gain a better understanding of the relationship between anomalistic belief and the conjunction fallacy using a newly developed measure of anomalistic belief. This new measure, the *Anomalistic Belief Scale* (ABS), was designed to address some limitations of other belief scales (discussed below) and to provide a means of testing whether type of belief (e.g., experiential, psi, etc.) is an important factor.

Although there are large variations in the types of anomalistic belief people hold, one aspect that has not received much attention is whether the relationship between anomalistic belief and cognitive bias and reasoning ability is the same for different anomalistic beliefs. Rogers et al. (2016) did show that the positive relationship they found between beliefs and the propensity to commit conjunction fallacies appeared stronger for psychokinesis (PK) beliefs, compared to life after death (LAD) and extrasensory perception (ESP) beliefs. It is not clear, though, how more diverse beliefs relate to performance; for example, does it matter whether the anomalistic beliefs are just *theoretical* (e.g., you believe in the possibility of psychic ability) versus *experiential* (e.g., you believe you have experienced psychic ability) in nature? Indeed, if the relationship is not the same for different types of belief and reasoning ability then that may go some way to explaining the variation in results found across different studies.

It is not possible to use the existing beliefs scales to explore our current interest in the relationship between different types of anomalistic belief and reasoning performance. The two most widely used anomalistic belief scales are the Australian Sheep-Goat Scale (ASGS; Thalbourne & Delin, 1993), and the Revised Paranormal Belief Scale (R-PBS; Tobacyk, 2004; Tobacyk & Milford, 1983). Although both scales have shown good reliability (Dagnall et al., 2007; Goulding, 2005; Thalbourne & Delin, 1993; Tobacyk, 2004; Tobacyk & Milford, 1983), they also have several noted issues. The primary issue with the R-PBS is that it covers a wide range of areas but does not provide breadth and variety of belief within those areas. The R-PBS has 26 items broken up across seven subscales; Traditional Religious Belief, Psi, Witchcraft, Superstition, Spiritualism, Extraordinary Life Forms, and Precognition (Tobacyk, 2004). Thus, there are very few items to cover the variety of beliefs that exist in each area, and several studies that have analysed the factor structure have reported finding only two factors (New Age Philosophy and Traditional Paranormal Belief; Houran, Irwin, & Lange, 2001; Lange, Irwin, & Houran, 2000). Further, some items do not appear to map onto paranormal belief (e.g., “There is life on other planets,” does not contradict our current understanding of reality), which may add noise to the measure because such items do not properly discriminate between high and low levels of anomalistic belief.

In comparison to the R-PBS, the ASGS is much more focused and consists of only 18 items that directly relate to either belief or experience of three parapsychological concepts: ESP, PK, and LAD. The narrower focus of the ASGS allows it to better capture the range, variety, and types of beliefs that people may have about these three concepts, however, this narrow focus also has some disadvantages. First, many related areas are not covered, such as psychic healing, tarot cards, extra-terrestrial visitation, et cetera. The exclusion of some anomalistic items is appropriate for a measure that focuses entirely on paranormal beliefs, however, this narrow specificity causes problems for studies looking more broadly at anomalistic beliefs. Second, there is an imbalance of items relating both to belief in and to experience of paranormal phenomena. For example, the item “I believe in the existence of ESP” relates to a theoretical belief in ESP, whereas the item “I believe I have had personal experience of ESP” relates to claimed experience of a paranormal phenomenon. Including both theoretical and experience belief items is important because there may be different psychological mechanisms involved and/or different psychological profiles between people who hold a theoretical belief and those who claim to have experienced paranormal phenomena. However, the ASGS (and also the R-PBS) does not include enough experiential belief items to analyse whether there are any differences between theoretical and experiential anomalistic beliefs. Thus, we developed the ABS both to capture a broader range of anomalistic beliefs and to provide a better balance of theoretical and experiential scale items.

1.1. The Anomalistic Belief Scale (ABS)

The ABS has 44 belief statements and is modelled on the ASGS, with some items from the ASGS incorporated into the new measure. We chose to use items from the ASGS rather than the R-PBS because the ASGS items are more clearly anomalistic and give better comprehensive coverage of each anomalistic belief they attempt to measure. Further, the ABS was constructed with particular consideration to the limitations of the previous scales. For example, given there is argument over some of the items included in the R-PBS, including concerns raised about the inclusion of traditional religious belief items (see Lawrence, 1995), specific attention was paid to ensure that items in the ABS related only to anomalistic beliefs.

The ABS also was designed to cover a wider variety of anomalistic belief areas than the ASGS. For instance, we included items about other forms of paranormal phenomena, such as beliefs about psychic healing and making predictions using objects (e.g., tarot cards, crystals, tea leaves). A key feature of the ABS is that it includes items related both to theoretical belief and experiential belief for each of the included anomalistic phenomena. For example, an additional three life after death items were created so that, in addition to the two items from the ASGS, there were items about whether people believe that they have experienced phenomena associated with life after death.

The current version of the ABS has two broad subscales of anomalistic belief; a paranormal subscale (items related to psychic ability, psychokinesis, ghosts, etc.) and an extra-terrestrial subscale (items related to alien visitation, UFO sightings, etc.). Although there are many other types of anomalistic belief that could be included (e.g., conspiracy theories), this first version of the ABS was intentionally limited to two broad subscales to enable adequate testing of its efficacy through factor analysis. For example, given the

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