“Meant to be”: how religious beliefs and cultural religiosity affect the implicit bias to think teleologically
Bethany T. Heywood\textsuperscript{a} & Jesse M. Bering\textsuperscript{a}
\textsuperscript{a} Anthropology Department, Ashford University, Clinton, Iowa, USA
Published online: 17 May 2013.

To cite this article: Bethany T. Heywood \& Jesse M. Bering (2014) “Meant to be”: how religious beliefs and cultural religiosity affect the implicit bias to think teleologically, Religion, Brain \& Behavior, 4:3, 183-201, DOI: 10.1080/2153599X.2013.782888

To link to this article: http://dx.doi.org/10.1080/2153599X.2013.782888

Taylor \& Francis makes every effort to ensure the accuracy of all the information (the “Content”) contained in the publications on our platform. However, Taylor \& Francis, our agents, and our licensors make no representations or warranties whatsoever as to the accuracy, completeness, or suitability for any purpose of the Content. Any opinions and views expressed in this publication are the opinions and views of the authors, and are not the views of or endorsed by Taylor \& Francis. The accuracy of the Content should not be relied upon and should be independently verified with primary sources of information. Taylor and Francis shall not be liable for any losses, actions, claims, proceedings, demands, costs, expenses, damages, and other liabilities whatsoever or howsoever caused arising directly or indirectly in connection with, in relation to or arising out of the use of the Content.

This article may be used for research, teaching, and private study purposes. Any substantial or systematic reproduction, redistribution, reselling, loan, sub-licensing, systematic supply, or distribution in any form to anyone is expressly forbidden. Terms \&
“Meant to be”: how religious beliefs and cultural religiosity affect the implicit bias to think teleologically

Bethany T. Heywood* and Jesse M. Bering

Anthropology Department, Ashford University, Clinton, Iowa, USA

A large body of previous research has found that people exhibit a cognitive bias to reason teleologically about natural kinds, explaining them in terms of intelligent design and inherent purpose. In the present study, we examined whether people are also cognitively biased to explain naturally occurring events in terms of inherent purpose (i.e., mistakenly attributing intentional design behind naturally caused life events), and if so, how explicit religious beliefs may interact with this implicit bias. A semi-structured interview was conducted concerning important autobiographical events. Overall, results indicated that differing levels of cultural religiosity (i.e., whether participants were from the relatively religious USA or the relatively secular UK) did not affect the tendency to reason teleologically. As predicted, explicit religious beliefs had an effect in that atheists gave significantly fewer teleological explanations than theists; however, half the atheists (n = 17) gave at least one teleological response and more than three-quarters (n = 26) gave a teleological response or admitted feeling conflicted between teleological intuitions and more rational, naturalistic explanations for significant life events. We interpret these results as suggesting that basic theory-of-mind competencies underlie the propensity to reason teleologically about major life events.

Keywords: atheism; teleology; theory of mind

1. Introduction

Recently, books promoting atheism as a social movement have become very popular (e.g., Dawkins, 2006; Dennett, 2006; Harris, 2004; Hitchens, 2007). Many of these “New Atheist” authors consider religion obsolete because science can provide better explanations. Somewhat in conflict with this sociopolitical stance, however, is the overwhelming body of recent evidence that has emerged from the relatively new “cognitive science of religion” field, which has demonstrated through numerous approaches that people are cognitively predisposed to believe in supernatural agents (Barrett, 2004; Bering, 2006; Boyer, 2001; Guthrie, 1993; McCauley, 2000), which leads individuals to find religious explanations intuitively appealing and psychologically seductive (Evans, 2000; Kelemen, 2004). In the present article, we examine how atheists manage to reconcile their rational, scientific beliefs with the intuitive cognitive biases that play such a large role in motivating religious belief.

Kelemen and colleagues have repeatedly found that children have a strong cognitive bias to give teleological explanations when reasoning about natural phenomena. For example, when questioned, preschoolers state that clouds are “for” raining and suggest that rocks are pointy so that animals will not sit on them.

*Corresponding author. Email: bethany.heywood@ashford.edu
Kelemen (2004) has found that, from the ages of about four to 10, children prefer these kinds of purpose-based explanations for the existence of a wide variety of objects, including living entities (e.g., lions exist “to go in a zoo”), artifacts, and non-living natural kinds. This bias does not appear to reflect a mere linguistic convention on the part of children, because when given the choice between (1) whether a natural kind (e.g., a cloud) is “made for” something or (2) whether it is just “used for” or could “do” certain activities, children still prefer teleological explanations (Kelemen, 1999a).

Based on her findings concerning children’s teleological tendencies, Kelemen (2004) has referred to children as “intuitive theists.” This term reflects the oftentimes explicit binding of teleological explanations for natural phenomena to an intentional designer. When questioned about the source of the purpose they perceive, children often appeal to a deliberate creator (usually God or “Nature” personified) who had intentions in mind when designing natural kinds (Kelemen & DiYanni, 2005). When questioned about artifacts, children also give purpose-based explanations and cite human beings as the creators. Given that human beings create artifacts for functional purposes, it makes sense to reason about these objects in terms of the intention of the creator. However, from a scientific perspective, there is no basis for inferring intentional design behind aspects of the natural world.

Evans (2000) has also found that five- to 10-year-olds from both fundamentalist and non-fundamentalist families tended to endorse creationist accounts of species’ origins (although among the youngest age group, Evans found a mix of creationist and spontaneous generationist responses). When asked “How did the very first [representative of a species] get here?”, only the oldest group of children (10- to 12-year-olds) showed signs of deviating from this creationist/spontaneous generationist bias, providing evolutionary-based accounts of origins. Among these older children, only those from non-fundamentalist families explained the origins of species in terms of evolution. Thus, this default mode of teleological reasoning does not seem to be attributable solely to parental influence, but has deep roots in a cognitive bias to think about origins in this manner.

If anything, parental influence seems to be minimal in encouraging or suppressing the bias to reason teleologically. When examining the types of answers that parents give in response to their children’s questions, Kelemen, Callanan, Casler, and Pérez-Granados (2005) found that parents mostly offered explanations involving natural causation. Even when told that adults prefer physical-causal explanations over teleological ones and when given physical-causal explanations for how certain natural kinds (such as clouds) form, seven- to eight-year-olds still preferred teleological explanations (Kelemen, 1999b).

At a certain point in their development, children begin to realize that scientific explanations are considered correct, and so they begin to rely upon scientific explanations, even though their first inclination might be to give teleological explanations. Kelemen and DiYanni (2005) posit that by age 10, most Western children know that scientific explanations are considered correct, but do not necessarily have enough mastery of scientific information to generate these answers for themselves, so when confronted with an open-ended question, children fall back on their teleological intuitions. Kelemen and DiYanni (2005) found that, in answering questions regarding the origins of various natural phenomena, 10-year-olds tended to choose scientific explanations when given different options. In contrast,
when answering open-ended questions, these participants tended to give teleological explanations.

In older children and adults, formal education and scientific knowledge can override and mask teleological thinking, but there is some evidence that the bias persists, often implicitly, throughout the life course. For example, adults with Alzheimer’s, as well as those operating under cognitive constraints (e.g., forced to make decisions under timed conditions), exhibit a strong preference for teleological explanations of natural kinds (e.g., “The sun makes light so that plants can photosynthesize.”) (Casler & Kelemen, 2008; Kelemen & Rosset, 2009; Lombrozo, Kelemen, & Zaitchik, 2007). Even more tellingly, professional physical scientists show a greater tendency to endorse teleological explanations for natural phenomena when operating under cognitive constraints, although to a lesser degree than college students or members of the general community (Kelemen, Rottman, & Seston, 2012). Thus, the bias to give teleological explanations for natural phenomena does not disappear from human cognition as a result of scientific education insomuch as it goes “underground” in explicit thought. Furthermore, research on people’s understanding of evolutionary mechanisms reveals a tendency to distort scientific facts in subtly teleological ways, viewing natural selection as a benevolently guided, needs-responsive process (Brumby, 1984; Greene, 1990; Shtulman, 2005).

To explain the bias to reason teleologically, Kelemen (1999a) theorizes that this tendency stems from the misappropriation of artifactual reasoning. Early in life, human beings understand how goals and intentions motivate the creation and use of artifacts. This understanding is then applied to non-artifacts, leading to purpose-based explanations for natural kinds that are created through non-intentional processes. Most of the empirical research on teleology has focused on how such purpose-based explanations are applied to natural kinds. However, people also appear to have a tendency to explain autobiographical events teleologically (i.e., by postulating that there is some inherent greater purpose or meaning behind a personal experience). Much like Kelemen, Bering (2002a, 2003, 2010) proposes that the tendency to reason about events teleologically stems from our species’ naturally evolved theory of mind, which allows human beings to understand the minds of others and, among other things, interpret behavior. The cognitive systems of human beings are fine-tuned to ascribe unobservable mental states to intentional agents in explaining and predicting behaviors. Bering argues that our species is so highly adapted to this type of social causal reasoning that we often over-detect intentionality, even in situations where there is clearly no human involvement, appealing to teleological reasoning to make sense of naturally caused events (e.g., illness or natural disaster).

Given related findings of underlying teleological cognitive biases in reasoning about natural kinds, there is reasonable evidence to suggest that people who do not explicitly believe in supernatural agents (e.g., God) may still express a teleological bias (e.g., “It happened for a reason.” or “It was meant to be.”) when interpreting personal experiences. If this is the case, atheists may have to cognitively override their initial teleological intuitions and substitute natural explanations in order to be consistent with their lack of supernatural beliefs. However, aspects of such teleological intuitions may still be expressed occasionally (albeit subtly) if atheists do not realize the conceptual implications of these intuitions, or if they do not have enough time to consciously process and reject these intuitions. For example, Shtulman (2005) found that many participants who stated that they understood
evolution and chose it as a better explanation than intelligent design still conceptualized natural selection as a quasi-intentional force with aims and goals. Such findings illustrate how difficult it is to avoid teleological thinking even when it is consciously rejected. Experts are much less inclined to make these kinds of errors, however, as Shtulman found when he tested three evolutionary biologists using the same task. And although scientists often use teleological or anthropomorphic language to convey certain ideas, it is clear that they understand that this kind of language is used metaphorically, not literally (Jacob, 1970/1973; Oakes, 1960). Laypeople, on the other hand, do not seem to make this distinction.

For clarity, we will be using the word teleological to describe improper ascriptions of purpose (e.g., to naturally or randomly occurring events). Some authors use the word to describe any kind of purpose-based explanation, but here, it makes sense to restrict the use of the word teleological in order to differentiate easily between references to warranted and unwarranted purpose-based explanations. When reflecting on their own lives, people give many different reasons for why things happen, and the majority of explanations are not teleological. However, if a person said, “If my flight hadn’t been delayed, I would never have met my soulmate; it was meant to be,” this would be an example of a teleological explanation. When giving teleological explanations, it must be established that a person means to indicate that the event in question had a greater purpose in his or her life, was not humanly caused, and explicitly or implicitly implicates non-human intentionality behind the event.

When giving explanations, people may also endorse natural causation (e.g., “My flight was delayed by bad weather.”) or say that an event was the result of an intentional, human action (e.g., “My flight was delayed by a terrorist threat.”). Neither of these explanations would be considered teleological, although the latter is clearly an event that was intentionally caused (i.e., the terrorist intended to cause a disruption). It is entirely warranted to attribute intentions to other human beings, so for our purposes, this type of explanation does not fall under the heading of teleology.

In some cases, a person may perceive an intentional cause behind an event but be unable to attribute this perceived intention to a human being. The bias to reason teleologically is predicated upon a general bias to attribute intentional explanations broadly and at times inappropriately. In cases where the perceived intention cannot be specifically attributed to a human agent, underlying intuitions that the event was intentionally caused may remain. Religious people usually match up these perceptions of non-human, supernatural intentionality with a culturally and context-appropriate supernatural agent (e.g., God, ghosts, guardian angels, etc.), although these unwarranted perceptions of intentionality may remain non-specific or be attributed to supernatural forces such as fate or destiny.

In fact, Rosset (2008) found that people exhibit a bias toward interpreting all human behavior as if it were intentional, including ambiguous though typically accidental actions (e.g., hitting someone with a car). Rosset also found that it required more cognitive effort for participants to override this bias and provide non-intentional explanations for accidental events (as measured by judgments made in timed conditions and by a recall task).

This kind of attribution error would not be termed teleological according to our definition of the word. Even if the conclusions are ultimately mistaken, it is not unwarranted to reason about human beings as intentional agents. For example, if
you believed that a person had caused a car accident on purpose, when really the person was asleep at the wheel, this would not be classified as a teleological explanation. You were mistaken in attributing intention to the person behind the wheel in this event, but as this person is an intentional agent, you were not fundamentally mistaken in assuming this person to be capable of intentional action. However, if you believed that the car accident had been arranged by fate so that you could learn to appreciate your life more, this would be classified as a teleological explanation because you would be perceiving an inherent purpose or meaning behind the event that could not be attributed to another intentional human agent.

Rosset’s work indicates that human beings are prone to over-attributing intention when reasoning about the actions of other human beings, but we posit that this bias goes even further, extending to events that have no plausible human (and potentially intentional) cause (e.g., illness and natural disasters). Guthrie (1993; see also Barrett, 2004) has proposed that anthropomorphism is at the root of religion. He notes that over-attributing agency would have been an adaptive strategy for our ancestors. For example, if you think a rustle in the bushes is a bear and run away, you do not come to any harm, even if the rustle was just caused by the wind. However, if you make the opposite mistake of dismissing the rustle as nothing but the wind, and it is actually a bear, you run the risk of dying. Thus, individuals who were more likely to over-perceive agency may have been selected for, perhaps partly accounting for the ubiquitous human tendency to posit supernatural agents. However, a bias toward hyperactive agency detection does not account for over-attribution of intentionality, too, which is where Bering’s work (2002a, 2003) comes into the picture, acknowledging the role of theory of mind in causing the propensity to reason teleologically about the world.

1.1 Predictions

Atheists and theists were interviewed about important autobiographical memories. It was predicted that both would give teleological explanations for significant life events, but that religious people would be more likely to name God or another supernatural agent specifically, while atheists would be more likely to use non-agentic teleological explanations, simply ascribing inherent purpose or meaning to events without specifying the origin of that intent. Given the cognitive tension that atheists may experience concerning teleological intuitions, it was also predicted that theists would feel more comfortable making teleological statements and would do so more often.

Teleological explanations for events may or may not be tied to specific supernatural agents. Religions postulate specific supernatural agents, while teleological reasoning is based upon perceptions of non-specified intent, which may then be matched up with a specific supernatural agent. Religious notions of supernatural influence in the world are certainly teleological, but teleological thinking appears to be broader, and perhaps primary to, religious explanations. Lombrozo, Kelemen, and Zaitchik (2007) have found some evidence that inferring design and purpose can occur without necessarily postulating a designer, even for artifacts, which are obviously designed by humans. Patients with Alzheimer’s disease preferred teleological explanations for a variety of artifacts and natural objects, but were not as likely as healthy participants to attribute the creation of these artifacts or natural objects to a person, supernatural agent, or natural process (Lombrozo, Kelemen, &
It seems that the inclination toward teleological explanations can exist without an explicit belief in an intentional agent as the cause.

If teleological reasoning represents a narrative default in interpreting one’s own past (e.g., Bering, 2002a, 2003), then differing levels of cultural religiosity should not affect the tendency to give teleological explanations, which is along the lines of Kelemen’s (2003) findings. To test this prediction, half of the participants were from the USA and half from the UK. This may not seem like a particularly exotic cultural comparison, but as Kelemen (2003) notes, the USA and the UK are as close to a “minimal pair” as can be found. The two countries share much in common, since both are industrialized, technologically advanced, literate, democratic nations where education is compulsory. There are many shared traditions, institutions, and social structures, not to mention the fact that both countries share a common majority language, as well as many of the same expressions and linguistic conventions. However, the USA is much more religious than the UK. Ninety-two percent of people in the USA believe in God or a universal spirit (Newport, 2011), and this percentage has remained roughly the same for at least the last 60 years (Newport, 2011). In addition, 60% of Americans believe in a personal God, as opposed to a more impersonal supernatural deity (The Pew Forum on Religion & Public Life, 2008). In the UK, belief in a personal God has decreased greatly compared to previous generations. In 1940, 43% of people in the UK said they believed in a personal God; this fell to 26% in 2000 (Bruce, 2002). Fifty percent of people in the UK do not identify with a particular religion (Park, Clery, & Phillips, 2011). On the other hand, 78% of people in the UK believe in God or a universal spirit or life force (European Commission, 2005). Thus, although the majority of people in both nations believe in supernatural agents or forces, the UK is still considerably less religious than the USA, and people in the UK are less likely to believe in a personal God who might intervene in human lives.

2. Methodology

2.1 Participants

Sixty-eight participants completed the study: 17 UK atheists, 17 UK theists, 17 US atheists, and 17 US theists. Participants were drawn from various online sources, such as newsletters and message boards as well as websites that advertise psychological studies. Of the 355 people who signed up to take part in the study, 121 were contacted, and out of those 121, 77 followed through to set up a time for the interview. Of the 77 participants interviewed, seven were used to pilot the study. After piloting, the interview script was shortened and changed in some places, due to evidence that participants were giving shorter answers toward the end of the interview. Two more participants were excluded from analysis; one did not fill out the demographic questionnaire and the other did not complete the interview. Of the 68 participants included in the final analysis, the mean age was 35 (range: 18–70 years), 62% were female, 93% were white, and 93% had some college or university education.

Only atheists and theists were contacted for the interview. Participants’ beliefs were classified based on their answer to the following question:

Which of the following most closely matches your current views on religion?
I believe in a soul, spiritual force, or god(s).
I am uncertain as to whether I believe in a soul, spiritual force, or god(s).
I do not believe in a soul, spiritual force, or god(s).

Participants who chose the first option were classified as “theists,” whereas those who selected the third option were classified as “atheists.” Those who chose the second option were not contacted. Although the terms “theist” and “atheist” refer primarily to belief or non-belief in god(s), these categories were intended to cover explicit belief in supernatural agency of any kind, including souls or spiritual forces (e.g., karma or fate). Therefore, the theists in this study believed in at least one kind of supernatural agency and the atheists did not believe in anything supernatural.

On the sign-up page, participants confirmed that they were at least 18 years of age, were natives and current residents of either the USA or the UK, and were native English speakers. In addition, participants were asked to write a few sentences about themselves so the researchers could assess their writing skills. Some participants made minor spelling/grammatical errors, but none were excluded based on their writing skills.

After this pre-screening process, each participant was contacted by email to set up a time for the online interview. Throughout the administration of the study, the interviewer was blind to the demographic characteristics and the religious beliefs of each participant unless participants specifically discussed these during the interview. On completing the interview, each participant was paid with a gift certificate to amazon.co.uk (for £5) or amazon.com (for the then-current exchange rate equivalent of £5, which was around $10).

2.2 Materials

All interviews were conducted using an online instant messaging program in which two people can type messages to each other in a chat window and receive those messages in real time. To standardize the procedure, the interviewer copied and pasted the interview script into the chat window. The participants were asked to describe two different memories (a “learning experience” and a “low point”). The two types of memories used in the interview were borrowed from McAdams’ (1993) life interview script. The descriptions and examples used were created specifically for the present study. Participants were given the following descriptions to prompt them to think of learning experiences and low points from their own lives (Table 1).

After writing a brief description of each event, participants were asked nine questions about each memory. Three of the nine questions were multiple-choice and

<table>
<thead>
<tr>
<th>Memory Description</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Learning experiences</td>
<td>Learning experiences can be characterized by any or all of the following: a feeling of growing up, evaluating life, gaining skills or knowledge, and gaining important insight. For example: any time you felt like you had learned something really important or grew as a person.</td>
</tr>
<tr>
<td>Low points</td>
<td>Low points can be characterized by any or all of the following: feelings of loss or suffering, pessimism, and depression. For example: any time you felt great sadness or experienced a loss that left a lasting impression.</td>
</tr>
</tbody>
</table>
the remaining six were open-ended. The interviewer occasionally asked follow-up questions to clarify participants’ responses. The multiple-choice questions were formulated to gain a better understanding of the specific characteristics likely to evoke teleological explanations (Table 2). Participants were informed that they could elaborate upon their responses whenever they wished.

The open-ended questions were created to probe the participants’ understanding of why the event happened, as well as what effect the event had upon their life (Table 3).

Finally, participants were asked five general questions, which were formulated to elicit information on the overall patterns that people observe throughout life (Table 4).

### 2.3 Procedure

Participants were instructed that there were no right or wrong answers to the questions in the interview, that they should refrain from using abbreviations or emoticons, and that they should not over-think or over-edit their answers. They were then asked to write a brief description of the event that they had chosen for the learning experience. Each participant was then asked the aforementioned set of nine questions about the learning experience. This same procedure was carried out for the low point, and then participants were asked the five general questions.

#### Table 2. Multiple-choice questions.

<table>
<thead>
<tr>
<th>Questions</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. How much control did you have over this event?</td>
</tr>
<tr>
<td>a. total control</td>
</tr>
<tr>
<td>b. some control</td>
</tr>
<tr>
<td>c. little control</td>
</tr>
<tr>
<td>d. no control</td>
</tr>
<tr>
<td>2. Would you characterize this event as:</td>
</tr>
<tr>
<td>a. completely unexpected</td>
</tr>
<tr>
<td>b. somewhat unexpected</td>
</tr>
<tr>
<td>c. somewhat expected</td>
</tr>
<tr>
<td>d. completely expected</td>
</tr>
<tr>
<td>3. If this hadn’t happened, would your life be:</td>
</tr>
<tr>
<td>a. better</td>
</tr>
<tr>
<td>b. the same</td>
</tr>
<tr>
<td>c. worse</td>
</tr>
</tbody>
</table>

#### Table 3. Open-ended questions.

<table>
<thead>
<tr>
<th>Questions</th>
</tr>
</thead>
<tbody>
<tr>
<td>4. Do you ever wonder why this event happened to you?</td>
</tr>
<tr>
<td>5a. What lesson(s) did you learn from this experience? [for the learning experience]</td>
</tr>
<tr>
<td>5b. Did you learn any lessons from this experience? [for the low point]</td>
</tr>
<tr>
<td>6. Did this deserve to happen to you?</td>
</tr>
<tr>
<td>7. How has this event changed your life (if at all)?</td>
</tr>
<tr>
<td>8. Do you feel as though this was supposed to happen to you?</td>
</tr>
<tr>
<td>9. Looking back, are you better able to understand why this event happened than you were at the time?</td>
</tr>
</tbody>
</table>

---

B.T. Heywood and J.M. Bering

Downloaded by [University of Otago] at 15:43 10 May 2015
At the end of the interview, participants were asked what results they thought the researchers would find. Many participants recognized that the theme of the interview had something to do with the way that people ascribe meaning to important events. Participants were initially told that the purpose of this study was to collect information on the different themes described in narratives about important memories, and also how these types of events and themes vary with different demographic characteristics such as age, gender, education, religion, culture, and location. Participants knew that religious and cultural differences were being assessed in this study, but none speculated that atheists and theists would both give teleological answers or that differing levels of cultural religiosity would not affect the tendency to give teleological explanations. Thus, although the purpose of the study was not entirely unknown to the participants, it was not entirely transparent either.

2.4 Coding

The first author coded all of the interviews and a research assistant coded half of the interviews \((n = 34)\) to establish the inter-rater reliability of the coding scheme. Both coders were blind to all demographic information about participants, including religious beliefs and country of origin, unless, of course, the participant mentioned one of these during the interview. The percentage of agreement between the two coders was 86% (Cohen's \(\kappa = 0.79\)). All disagreements were resolved through discussion.

The coding scheme for this study included six categories: Descriptive, Natural Causal, Teleological, Anti-teleological, Conflicted, and Ambiguous. These categories were intended to cover the wide range of potential responses that participants were likely to provide over the course of the interview. Some of the questions did not directly inquire about the cause of an event (e.g., when participants were asked what they learned from the event). If participants did not mention the cause of the event when answering these types of questions (and often they did not), these responses were coded Descriptive. Other questions asked participants to reason causally about the event or about some aspect of the event (e.g., when the participants were asked if they ever wondered why the event happened or if it deserved to happen). The answers to these types of questions were given one of the following codes: Natural Causal, Teleological, Anti-teleological, or Conflicted. For all questions, if a participant said that they did not know how to answer the question, if it was not clear what the participant meant, or if they did not actually answer the question (e.g., describing the event again, rather than stating why the event was supposed to or not supposed to happen), these types of responses were given the code Ambiguous.
For the multiple-choice questions, participants were informed that they could elaborate upon their choices if they wanted to, but many chose not to. If a participant chose not to elaborate upon their answer to a multiple-choice question, this type of response was coded with a dash (–) because there was nothing in the response that required coding. From a theoretical point of view, participants’ causal explanations were of particular interest, so the categories of Natural Causal, Teleological, Antiteleological, and Conflicted will each be explored in depth. The category Natural Causal covered any response where a natural, non-human cause or an intentional, human cause was cited as the only cause (e.g., “As I have matured and taken time away from my mother I have come to realize that her problems stemmed from a mental disorder.”). Additionally, any time a participant indicated that an event was inevitable or bound to happen based upon social norms or as part of the normal course of life (e.g., “It [having an unrequited crush] happened because that’s what happens in high school—it’s not always a fun time.”; “It [making an important realization about people’s expectations] was bound to happen sometime, given the right circumstances.”), this type of answer was classified as Natural Causal (Table 5).

The Teleological category included responses in which participants indicated that they perceived supernatural intent behind an event, and also responses in which participants directly stated that a supernatural agent had played a causal role (e.g., “I always seem to think why me? To answer I don’t think I have an answer other than as a christian I just put it up to God and its his plan for my life.”). Sometimes participants merely mentioned that a supernatural agent was behind an event without mentioning what they thought the supernatural agent intended by causing the event (e.g., “I believe that God works in the world but just don’t know how.”). Sometimes participants mentioned a specific supernatural agent and then stated why the agent had acted as it did (e.g., “I believe that God has a way of finding ways to reconcile people.”). In many instances, however, participants indicated that they perceived a greater purpose or meaning to the event without specifying any kind of agent as the source of that purpose or meaning (e.g., “Sometimes after things happen, I think they happened for a reason and you are a better person for it.”). Responses of this latter type were the most difficult to code because it was necessary to establish that the perceived greater purpose or meaning did not (or could not) originate from a human source. Directly agentic responses (i.e., responses that mention a specific supernatural agent) and non-agentic responses were both included in the Teleological category; agentic responses were considered a sub-type of the broader category of Teleological responses. Teleological perceptions do not hinge

Table 5. Natural Causal responses.

<table>
<thead>
<tr>
<th>Code</th>
<th>Examples</th>
</tr>
</thead>
</table>
| Natural Causal | 4. Do you ever wonder why this event [end of a romantic relationship] happened to you?  
B216 [theist]: Nope, it was my own actions that allowed it to transgress as it did.  
4. Do you ever wonder why this event [a period of exhaustion that triggered illness] happened to you?  
B100 [atheist]: No—there is a logical medical explanation |
upon belief in specific supernatural agents, but rather arise from overactive social cognition, and can often result in perceptions of non-specific supernatural purpose.

In addition, if a participant mentioned a natural cause for the event, but then continued to wonder why it had happened to him or her in particular, or mentioned justice or deservedness for an event that should not have been conceptualized in these terms (e.g., an event that was due to chance or natural causes), these types of responses were often coded Teleological (e.g., “Why should I lose my daughter when there are many nasty people in the world?”) (Table 6).

The Anti-teleological category covered responses in which participants explicitly rejected the idea that there was a teleological cause for an event. A few different types of responses were coded Anti-teleological: (1) when participants expressed the idea that there was no special reason or purpose to an event (e.g., “It [grandmother dying] wasn’t completely unexpected and everybody dies, clearly. I didn’t like it, but I didn’t ‘wonder why’.”); (2) when participants specifically mentioned that no supernatural agents or forces caused the event to happen (e.g., “I don’t think of it [having a child] as part of an overall predestined plan or anything.”); and (3) when participants stated that there was no reason for the event to happen, that it just happened, or that it was pure chance or luck that the event had happened as it did (e.g., “[When the participant feels like asking ‘why me?’ about certain events, she concludes that] It’s just bad luck. I just deal with the consequences and try to regain a positive attitude as best I can.”) (Table 7).

Table 6. Teleological responses.

<table>
<thead>
<tr>
<th>Code</th>
<th>Examples</th>
</tr>
</thead>
</table>
| Teleological | 8. Do you feel as though this [moving to a new place and starting over after a divorce] was supposed to happen to you?  
B43 [theist]: Absolutely. It was difficult to pick up and move to somewhere, sight unseen, far away from family to fall back on if I failed. Even with that, I felt like this was what I was supposed to be doing and my rapid success when I arrived reinforced that belief.  
6. Did this [failing an important course] deserve to happen to you?  
B50 [atheist]: I don’t know, maybe it happened for a reason  
What reason do you think that might be?  
B50: so that I could see that even if I failed a course, my life wouldn’t actually end |

Table 7. Anti-teleological responses.

<table>
<thead>
<tr>
<th>Code</th>
<th>Examples</th>
</tr>
</thead>
</table>
| Anti-teleological | 8. Do you feel as though this [having a hard time finding a job after completing school] was supposed to happen to you?  
B64 [theist]: No  
In what way?  
B64: I feel that this was one of many possible outcomes of my educational journey, not fate.  
8. Do you feel as though this [learning more about social interactions at university] was supposed to happen to you?  
B38 [atheist]: again, the idea that things are ‘supposed’ to happen implies some idea of fate, or a divine plan, or something like that. I don’t believe in such things, which I think helps me to accept the more difficult things in life |
In some instances, participants were aware of the fact that they had conflicting feelings about an event or that they recognized that more than one explanation could apply to the situation. The Conflicted category, therefore, encompassed any kind of conflict, tension, or overlap between Teleological and Anti-teleological explanations. For example, if a participant admitted that he/she used to view events teleologically but no longer did (e.g., “I used to [see meaning in coincidences]. But I was young. More often than not I looked for meaning in things that seemed to lead me in a direction in which I wanted to go anyway.”), or if a participant indicated that he/she would like to view events teleologically but logically could not (e.g., “I am tempted to think that [betrayal by a partner was supposed to happen] because I think I am in a better position than I was. I feel more fit to deal with my life, but I think it’s still pretty random.”) (Table 8).

Participants sometimes gave multiple explanations for the same event (e.g., recognizing a natural cause but also stating that there was a teleological purpose to the event). For instance, people may have reasonably accurate scientific knowledge as to the cause of an event (e.g., that an illness is caused by unseen germs), but alongside these rational explanations they see some greater meaning or purpose in the event as well (Legare & Gelman, 2008). However, for the sake of simplicity, only one code was allotted to each response. Certain causal explanations were of more theoretical interest than others, so if participants mentioned anything Teleological or Anti-teleological, these codes superseded all others. If Teleological and Anti-teleological explanations occurred together, the response was coded Conflicted. If a Natural Causal response occurred with a Descriptive or Ambiguous element, the response was coded Natural Causal.

For the learning experience and the low point, all responses were coded individually (although the coders were allowed to refer to the brief description of the event for clarification). If a participant specifically mentioned something that he/she had said in a previous response (e.g., “I covered this in my answer to question 4.”), then the response cited was taken into account when coding the later response.

Table 8. Conflicted responses.

<table>
<thead>
<tr>
<th>Code</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conflicted 4. Do you ever wonder why this event [being shot at] happened to you?</td>
<td></td>
</tr>
<tr>
<td>B41 [theist]: all the time the more spiritual side of me says that was the moment of my life that tempered me. that was my test. I made it out because I’m supposed to be here for some reason. the realist says I got lucky [emphasis in original]</td>
<td></td>
</tr>
<tr>
<td>5. Do you ever think you see meaning in events that are seemingly coincidental?</td>
<td></td>
</tr>
<tr>
<td>B101 [atheist]: occasionally I catch myself thinking like that—but really I know that is irrational could you give me a quick example of the type of thing you’d catch yourself thinking it about?</td>
<td></td>
</tr>
<tr>
<td>B101: well for example—today I got made redundant—and I found myself thinking—maybe this is meant to happen to I can find a better job—or move to a different country to work—something like that but in reality I don’t believe in fate—so its strange to find oneself thinking like that</td>
<td></td>
</tr>
</tbody>
</table>
3. Results

The number of responses each participant gave in each of the coding categories was added up to yield a total overall score for the whole interview. The interview consisted of 25 questions (including the brief descriptions for each memory), and each response was accorded only one code. Most of the Anti-teleological responses came from atheists (74.5%, 149 responses), while most of the Teleological responses came from theists (81.7%, 125 responses). Fifty percent of the atheists (17/34) gave at least one Teleological response, 47.1% (16/34) gave at least one Conflicted response, and 76.5% (26/34) gave at least one Teleological or Conflicted response.

3.1 Analyses

Most of the data were non-normally distributed and exhibited heterogeneity of variance, so non-parametric tests were used exclusively. For more complicated analyses, non-parametric one-way multivariate analyses of variance (MANOVAs) were run. These were calculated using the method described by Puri and Sen (1971) and elaborated upon by Zwick (1985). The data were transformed into ordinal ranks and then a parametric MANOVA was applied. A $\chi^2$ statistic was calculated by multiplying the Pillai-Bartlett trace by $N - 1$. All tests were two-tailed.

3.2 Demographic variables

To rule out possible extraneous factors, a variety of demographic information was analyzed. Non-parametric one-way MANOVAs were conducted for several demographic variables (using the technique described above). Race, gender, age, and level of education had no significant effect on the types of responses that participants gave in the six coding categories, although the number of participants in some of these categories was small (e.g., there were few people belonging to racial minorities).

3.3 Multiple-choice questions

The relationship between the multiple-choice questions and ascriptions of teleology was examined. There were no specific hypotheses concerning this, but previous piloting research indicated that uncontrollable and unexpected events would be more likely to evoke teleological explanations. The content of the multiple-choice questions concerned controllability (question 1), expectedness (question 2), and the effect that the event had on the participant's life (i.e., whether it was positive, negative, or neutral) (question 3). Three Kruskal-Wallis tests were run to determine whether participants’ responses on the three multiple-choice questions were related to their tendency to give teleological explanations for the learning experience, and a second set of three tests was run for the low point. A Bonferroni correction was applied to each set of three tests, meaning the new significance level was set at $p = (.05/3) = .017$. Only one test approached significance. The relationship between the number of teleological responses given for the low point and expectedness (question 2) was nearly significant ($H(3) = 8.44, p = .038$). The largest difference in mean ranks was between choice B (somewhat unexpected, mean rank = 41.41) and C (somewhat expected, mean rank = 24.81). No other tests approached significance ($p > .356$).
3.4 Religion

The effect that participants’ religious beliefs (atheist or theist) had upon the types of responses they gave in the interview (i.e., how many responses they gave in each of the six coding categories) was examined using a non-parametric MANOVA. When the Pillai-Bartlett trace ($V = 0.484$) was multiplied by $(N - 1 = 67)$, this resulted in $\chi^2(6) = 32.43, p < .001$. Post-hoc Mann-Whitney tests were run combining the independent variable of belief with all six dependent variables (which consisted of the number of responses given in each of the coding categories). A Bonferroni correction was applied to all tests, and the new significance level was set at $p = (.05/6) = .008$.

Three comparisons were significant. Theists gave significantly more Teleological responses ($Mdn = 3.00$, $IQR$ [interquartile range] = 1.75–6.00) than atheists ($Mdn = 0.50$, $IQR = 0.00–1.00$) ($U = 225.50$, $p < .001$, $r = -0.54$); and theists also gave significantly more Ambiguous responses ($Mdn = 3.00$, $IQR = 1.00–4.00$) than atheists ($Mdn = 1.00$, $IQR = 0.00–2.00$) ($U = 328.5$, $p = .002$, $r = -0.38$). Atheists gave significantly more Anti-teleological responses ($Mdn = 4.00$, $IQR = 2.75–6.25$) than theists ($Mdn = 1.00$, $IQR = 0.00–1.25$) ($U = 213.5$, $p < .001$, $r = -0.55$). In addition, atheists gave more Natural Causal responses ($Mdn = 5.00$, $IQR = 4.00–7.00$) than theists ($Mdn = 4.00$, $IQR = 2.75–6.00$), but with the adjusted significance level, this was not quite significant ($U = 420.5$, $p = .05$, $r = -0.24$). No other comparisons approached significance ($p > .112$) (Figure 1).

3.2 Country

The effect that the participants’ country (USA or UK) had upon the types of responses they gave in the interview (i.e., the number of responses given in each of the six coding categories) was also examined. A non-parametric MANOVA was run and the
Pillai-Bartlett trace was 0.053, which converted into $\chi^2(6) = 3.55$, $p = .74$. Non-parametric MANOVAs were also conducted to look at the difference between theists from the USA versus theists from the UK, as well as atheists from the USA and atheists from the UK. No significant differences were found between either pair ($p > .34$).

4. Discussion

As expected, theists gave more Teleological responses than atheists in reasoning about the causes of life-altering events; however, and perhaps more importantly, such answers were also found to some degree in the causal reasoning of atheists. These results suggest that people are subject to a bias to view important life events teleologically, and that this bias is not caused directly by explicit belief in supernatural agents or high levels of cultural religiosity. Indeed, to some extent, this bias affects even atheists and people living in relatively secular countries. Thus, it appears that human minds reason intuitively about significant life events in teleological terms. Half of the atheists in the present study gave Teleological responses, although they did so significantly less than theists when the volume of responses from each group was examined.

Dual-processing theories of cognition may help to explain individual differences in the expression of teleological perceptions and why some people are more likely to be able to override them. For example, Devine (1989) found results analogous to those in the present study when researching the automatic and controlled processes involved in mediating prejudice. In one of her studies, Devine demonstrated that when stereotypes were automatically activated with implicit primes, even participants who explicitly rated themselves as unprejudiced exhibited racially based prejudice to the same extent as participants who rated themselves as highly prejudiced. Another study showed that it required time and effort for participants to consciously inhibit prejudiced responses and to react in an unprejudiced manner (Devine, 1989). This was the case even for participants who found certain stereotypes wrong and distasteful. Stereotypes in general operate as a kind of heuristic, providing pre-packaged information that can be processed quickly. Devine (1989, p. 6) notes that her model of prejudice “holds that this unintentional activation of the stereotype is equally strong and equally inescapable for high- and low-prejudice persons.” This relates to the present study in that presumably atheists and theists are subject to the same cognitive bias to view the world teleologically, but atheists must consciously override this bias in the same way that people work to overcome the bias to negatively categorize out-group members.

However, it may not necessarily be that atheists are simply better at overriding their implicit bias toward teleology, but rather that they are perhaps less likely to have teleological perceptions in the first place. Kelemen’s (1999a, 1999b, 2003, 2004) work suggests that children and even adults are subject to a bias to reason about the natural world teleologically, and that this explanatory bias does not disappear because of advanced education as much as it is overridden by explicitly learned scientific knowledge (see also Kelemen et al., 2005; Kelemen & DiYanni, 2005; Kelemen & Rosset, 2009). However, the religious adults in the present study were very willing to admit to teleological perceptions about their own lives, while the atheists did so more sparingly, but still more than would be expected given their absence of supernatural beliefs. Related research shows that people are able to endorse both natural and supernatural beliefs at the same time, having overlapping explanatory beliefs in different domains (Legare & Gelman, 2008; Subbotsky, 2001).
Similarly, Lindeman and Aarnio (2007) found that believers in paranormal phenomena relied more on intuitive and less on analytical thought than skeptics (see also Aarnio & Lindeman, 2005, 2007). Believers in paranormal phenomena did not lack the ability to think analytically—they just relied more on intuitive thinking. Additionally, Lindeman and Saher (2007) found evidence for the coexistence of scientific knowledge and vitalistic beliefs. Participants were able to understand and endorse correct, scientific explanations while also holding vitalistic beliefs concerning the body (e.g., believing that cuts “want” to heal). Along similar lines, Shenhav, Rand, and Greene (2012) found that believers, regardless of education, socioeconomic status, and political orientation, exhibited greater reliance upon intuition, as opposed to reflection.

If a similar model applies to theists and atheists, it may be that theists have complementary explanatory models for the world, involving both supernatural and natural domains, and that they rely more on intuitive rather than analytical thinking. Atheists, on the other hand, may rely more on analytical thinking and have less tolerance for explanatory overlap of this kind. Since social cognitive skills underlie this ability to perceive purpose and meaning behind events in one’s life, could it also be that atheists have deficits in social cognitive capabilities compared with their religious counterparts?

Bainbridge (2005) shows that atheists have fewer social obligations such as spouses or children. Bainbridge hypothesizes that fewer social obligations leads to weaker religious commitment, but it could also be that those who are less inclined toward social relationships with other human beings are less inclined toward relationships with supernatural agents or teleological perceptions in general. Furthermore, Crespi and Badcock (2008) propose that autism spectrum disorders and psychotic spectrum disorders (mostly schizophrenia, but also bipolar disorder and major depression) are conditions that affect social cognition in opposite ways. Many have noted that autism is characterized by difficulties in social functioning, including problems in understanding and monitoring gaze, difficulties with shared attention, and impaired or delayed theory of mind (for an overview, see Baron-Cohen, 1995). Crespi and Badcock (2008) argue that schizophrenia shows an opposite psychosocial profile of markedly over-developed social cognition. Schizophrenics often attribute too much meaning to gazes (e.g., feeling watched or spied on when this is not the case), over-analyze social cues, experience auditory hallucinations, and frequently experience religious and superstitious delusions (Brugger, 2001; Brugger & Graves, 1997a, 1997b; Eckblad & Chapman, 1983; Leonhard & Brugger, 1998; Tamminga & Holcomb, 2005).

Research shows that people with autism are less likely to believe in supernatural agents in general, and when they do believe, they are less likely to believe in a personal god who is responsive to human concerns (Norenzayan, Gervais, & Trzesniewski, 2012). It may be that atheists’ social cognitive abilities are not as strong as that of theists. However, it may also be that atheists are simply more inclined toward explicitly overriding these teleological perceptions. An unpublished replication of the current study with participants who have Asperger’s syndrome showed that they were less likely to give any kind of teleological response (e.g., teleological, conflicted, or anti-teleological) (Heywood, 2010). Atheists were quick to understand the meaning of the questions and indicate that they did not see an underlying meaning or purpose in their lives, although many indicated that they sometimes had teleological perceptions, endorsed teleological explanations in the past, or felt conflicted. Gervais and Norenzayan (2012, p. 493) also found that religious disbelief
was correlated with analytical thinking and the ability to “override initially flawed intuitions.” People with Asperger’s syndrome seemed to be less able to grasp the teleological angle of the questions, although they do not have intellectual or linguistic impairments in general (Colle, Baron-Cohen, Wheelwright, & van der Lely, 2008). Further research will be necessary to resolve these questions raised in the present study.

There are several limitations to the present study that should be addressed in future research. It could be argued that when participants mentioned events that were “meant to be” or “happened for a reason,” this was simply linguistic convention or commonly used turns of phrase, signifying nothing teleological. Kelemen (1999a), however, found that children prefer explanations for the natural world that incorporate teleological language over similar explanations with non-teleological language (e.g., when given the choice of whether a natural kind is “made for” something or whether it is just “used for” or could “do” certain activities, children prefer the teleological explanation). However, even if people do not explicitly mean to convey a belief in supernatural causation, the aforementioned phrases do carry connotations of intentional causation, and it may still be a sign of the implicit cognitive bias to apply social causal reasoning to the world at large.

Similarly, although it is posited that there is an implicit cognitive bias to reason teleologically about salient, personal events, none of the measures in the present study were implicit. However, Kelemen and Rosset (2009) have shown that when university students are operating under cognitive constraints, they show a stronger preference for teleological explanations for the natural world, and Kelemen et al. (2012) have shown that scientists exhibit a similar tendency to endorse unwarranted teleological explanations when operating under cognitive-processing restrictions. Although the present study did not employ implicit measures, other studies have shown that explicit measures can reveal implicit biases (e.g., Barrett & Keil, 1996; Bering, 2002b). In examining the implicit nature of afterlife beliefs, for example, Bering (2002b) found that even strict “extinctivists” (those who do not believe in an afterlife), still often reasoned about a dead fictional character in terms of psychological continuity (e.g., stating that the character “knew” he was dead and thus attributing epistemic ability to the deceased). With the right task, it is possible to tap implicit biases with explicit measures.

In summary, individual differences in the propensity to rely upon intuitive or analytical modes of thinking most likely influence the bias to give teleological explanations for important life events and enable some people more than others to consciously override their implicit teleological perceptions. Although atheists overall tend to come from families that did not emphasize religion, Hunsberger and Altemeyer (2006) still found that more than 70% had believed in God at some point in their lives, so belief is not entirely alien to atheists. Atheists are likely subject to the same cognitive biases as theists, but, for still uncertain reasons, they are more inclined or better able to explicitly override implicit teleological reasoning. What the present study demonstrates is that implicit teleological perceptions still bleed through occasionally.

Acknowledgements

The authors wish to acknowledge the contributions of Dan McAdams for suggesting the use of instant messaging for conducting interviews, Greg Shalkoski for screening participants,
Notes
1. More people signed up than were needed, especially from the USA.
2. The first author can provide the complete interview script.
3. The first author can provide the full coding scheme.
4. All responses are presented in the form in which they were given, including spelling and grammar errors. Context for some of the responses has been provided in brackets.

References


