SKEPTICAL SAINTS AND CRITICAL COGNITION: ON THE RELATIONSHIP BETWEEN RELIGION AND PARANORMAL BELIEFS

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SKEPTICAL SAINTS AND CRITICAL COGNITION:
ON THE RELATIONSHIP BETWEEN RELIGION AND
PARANORMAL BELIEFS

Douglas S. Krull & Eric S. McKibben*

ABSTRACT

The literature on the relationship between religion and belief in the paranormal is complex and sometimes seemingly contradictory. However, previous research suggests that this relationship depends on the religious characteristics of the sample and the measures of religion. Research also suggests that science knowledge is unrelated to paranormal beliefs, but critical thinking is at odds with paranormal beliefs. Psychology college students and conservative Christians answered questions about paranormal beliefs, religious beliefs, Bible knowledge, science knowledge, and evidence-based thinking. Conservative Christians displayed the lowest belief in the paranormal. Religious beliefs and paranormal beliefs were unrelated, but attendance at services was negatively related to paranormal beliefs. Evidence-based thinking was also negatively related to paranormal beliefs.

Belief in the paranormal (i.e., pseudoscience, New Age) seems to be quite widespread. Rice (2003) found that 60.1% of his national sample believed in ESP and 35.2% believed that extraterrestrials have visited earth. Orenstein (2002) found that 54.5% of his Canadian national sample believed in psychic powers and 42.4% reported personal experience with precognition. Sparks and Miller (2001), in their sample of 200 participants from a medium-sized Midwest city, found that 34% believed that people have seen flying saucers from outer space, 45.5% believed that people have seen ghosts, and 35.5% believed that some people have psychic abilities that enable them to help police solve crimes by touching objects that belonged to the victims. Perhaps to the surprise of some scholars, such beliefs do not seem to be uncommon among those who are highly educated and interested in science. For example, Evans (1973) reported that 67% of

* The authors would like to thank the following professors who helped to provide science knowledge questions: Dr. Julia Bedell, Dr. Richard D. Durtsche, Dr. Tammie Gerke, Dr. Diana McGill. The authors would also like to thank Lori Krull and an anonymous reviewer for their comments on an earlier draft of this article.
his sample of New Scientist readers indicated that ESP was likely or a fact. The prevalence of paranormal beliefs has caused no little concern among the skeptical community. However, scientists of religion may be more interested in the interplay between religion and paranormal beliefs.

The literature on the relationship between religion and belief in the paranormal is complex with many apparently conflicting findings (see e.g., Rice, 2003), but at least three conclusions do seem warranted. First, religion seems to be positively related to some paranormal beliefs, but negatively related to others (e.g., Grimmer & White, 2001; Tobacyk & Milford, 1983). For example, Williams, Taylor, and Hintze (1989) found that pure intrinsics (high on instrinsic religiosity, low on extrinsic religiosity) tended to be higher on belief in precognition but lower on belief in astrology. Second, how religion is operationalized affects the relationship between religion and belief in the paranormal. For example, Orenstein (2002; see also McKinnon, 2003) found that religious beliefs were positively related to paranormal beliefs, but service attendance was negatively related. Third, the relationship between religion and belief in the paranormal depends on the type of religion under consideration. For example, members of liberal denominations seem to be higher than members of conservative denominations in paranormal beliefs (e.g., Donahue, 1993). People who report mystical experiences also show higher levels of paranormal belief (e.g., Thalbourne & Delin, 1999). Recent research by Bainbridge (2004) suggests that the relationship between religion and paranormal beliefs may be curvilinear; both the extremely religious and the extremely nonreligious (Atheists in particular) seem to be low in paranormal beliefs compared to others.

Although the research on the relationship between religion and belief in the paranormal is both informative and fascinating, much of the work has relied on self-report measures of religiosity. Research indicates that people tend to inflate their religious involvement (e.g., Hadaway, Marler, & Chaves, 1993). As such, whereas people who claim to be nonreligious probably really are nonreligious, at least some people who claim to be very religious may not be. Thus, it may be informative to recruit and investigate individuals who seem to be particularly devout based on criteria other than self-report. How might the degree of belief in the paranormal for such individuals differ from that of less religious individuals? A primary goal of the current research was to investigate this question.
A second goal of the research was to investigate evidence-based thinking. Recent research suggests that several variables that one might have expected to be at odds with paranormal beliefs do not seem to be. For example, science knowledge does not seem to immunize people against paranormal beliefs (e.g., Hoekstra, Yoder, Walker, & Vogl, 2003; but see Mill, Gray, & Mandel, 1994). Need for Cognition also seems to be unrelated to belief in the paranormal (e.g., Deeb, Vogl, McGee, Walker, & Hoekstra, 2002), as does logical reasoning (Fitzgerald, Vogl, Walker, & Hoekstra, 2003). Remarkably, an interest in science is positively correlated with paranormal beliefs (e.g., Walker, Vogl, & Hoekstra, 2001), suggesting that people may fail to distinguish between science and the paranormal, and analytical individuals hold stronger beliefs in the paranormal than do intuitive individuals (e.g., Hoekstra & Walker, 2002). Walker, Hoekstra, and Vogl (2002) have suggested that science education does not reduce paranormal beliefs because, although students may learn what to think, they do not learn how to think. Consistent with this, research suggests that critical thinking is negatively related to paranormal beliefs (Gray & Mill, 1990) and, although science knowledge may be unrelated to paranormal beliefs, scientific reasoning is at odds with paranormal beliefs (Hoekstra et al., 2003). The current research included items designed to tap the degree to which people think decisions should be based on evidence. How might more religious and less religious individuals compare on the degree to which they endorse such evidence-based thinking? Might evidence-based thinking be negatively related to paranormal beliefs? The current research also investigated these questions.

**Investigation 1**

**Method**

**Participants.** Ninety-two students were recruited from upper and lower division psychology courses at a midwestern regional university. In addition, 27 participants were recruited from a nearby religious meeting. This religious meeting was sponsored by a local congregation of the church of Christ and was particularly designed to encourage adolescents and young adults. This provided a good opportunity to recruit college-age participants. The church of Christ is a conservative religious group (e.g., Bainbridge & Stark, 1980). Moreover, many
attendees had traveled some distance to attend this multiple-day religious meeting, suggesting that they were quite dedicated with regard to religious matters. Data presented below on attendance at religious services, charitable giving, and Creation/Evolution beliefs were consistent with this characterization.

Procedure. The students recruited from psychology courses completed the questionnaire in their classrooms. The Christians recruited from the religious meeting completed the questionnaire in an auditorium after an evening service. With the permission of the organizers of the meeting, one of the researchers requested participants, particularly those of approximately college age.

Dependent measures. Participants indicated their degree of belief in 12 areas of the paranormal (astrology, crystals, channeling, the zodiac, ghosts, ESP: precognition, ESP: telekinesis/psychokinesis, ESP: telepathy, palm-reading, crystal balls, UFOs, Bigfoot/sasquatch/yeti/abominable snowman), using a nine-point scale anchored with the phrases Strongly Do NOT Believe and Strongly Believe. A one-sentence description was given for each. For example, the description for precognition was: That some people have psychic abilities that enable them to know the future.

Participants indicated their degree of belief in eight doctrines of Christianity (God, heaven, hell, angels, the Devil/Satan, inspiration of the Bible, the resurrection of Jesus Christ) using the same nine-point scale used for the paranormal belief items. Each of these was also accompanied by a one-sentence description. For example, the description for prayer was: That praying to God can affect events.

Participants answered 12 multiple-choice Bible knowledge questions (e.g., Who was very strong until his hair was cut?, Which verse says that faith comes by hearing, and hearing by the word of God?, Which book describes how God led the people of Israel out of Egypt?), and were asked to try to answer correctly regardless of their belief in the Bible. Although one can have religious knowledge without being religious, these questions might provide an interesting measure of religiosity that is not subject to social desirability.

Participants answered 12 multiple-choice science knowledge questions (e.g., Which is a correct description of the organization of subatomic particles in atoms?, The process of trapping light energy and converting it to chemical energy is called:, Which of the following would be included in the hydrologic system?). Introductory level questions were obtained from faculty members in Biology, Chemistry, and Geology. An attempt was made to select questions that one
might know even if one had not taken a particular science course.

Participants indicated their degree of agreement with 12 evidence-based thinking items (e.g., If you want to decide which of two views is better, it is a good idea to consider the evidence for both sides. On issues where there is disagreement, a good way to get at the truth is to take a poll to determine which position the majority of experts believe [reversed]. Ideas are not very useful unless there is a way to determine whether or not the ideas are true.; see appendix A for a complete list), using a nine-point scale anchored with the phrases Strongly Disagree and Strongly Agree. These items were derived from suggestions by Sagan (1996; see also Johnson, 1997).

Participants also completed several demographic questions (e.g., age), questions about religious practices (e.g., attendance at services), questions about moral issues (e.g., charitable giving), and additional questions (e.g., Creation/Evolution beliefs), some of which are only tangentially related or unrelated to this manuscript.

Results and Discussion

The data provided information about how the participants from the religious meeting differed from the psychology students as well as information about the relationships between the variables of interest. These findings are described briefly.

Differences Between Groups

Analyses were conducted to determine how the participants from the religious meeting differed from those recruited from psychology courses. However, because psychology students also differ in how religious they are, it seemed useful to divide the psychology sample into those who were more or less religious. Several variables could be used. Attendance at religious services was chosen because it provided a clear division. Of the 92 psychology students, 43 indicated that they attended no services in a typical month. The remaining 49 psychology participants indicated that they attended at least one service (M = 3.39 services/month, SD = 2.32). For comparison, the twenty-seven religious meeting participants indicated that they attended 12.00 services (SD = 2.70) in a typical month, F(2, 113) = 311.27, p = .001.

To provide additional comparison information, the participants from the religious meeting indicated greater monthly charitable giving (M = $145.43) than either the psychology students who reported
attending services ($M = $38.27$) or those who did not ($M = $8.79$), $F(2, 108) = 24.17$, $p = .001$.

And, with regard to Creation/Evolution beliefs, nearly all religious meeting participants endorsed young earth creation, but psychology students who reported attending services tended to favor old earth creation and those who did not report attending services tended to favor theistic evolution, $F(2, 112) = 43.33$, $p = .001$.

Thus, it appears that the participants from the religious meeting were quite different, based on both their presence at the meeting as well as these self-report measures.

Indices were created for the five variables of interest (paranormal beliefs, religious beliefs, Bible knowledge, science knowledge, and evidence-based thinking). Although the overall means were not of primary concern, it was interesting to note that participants endorsed religious beliefs ($M = 7.65$) to a much greater degree than paranormal beliefs ($M = 2.66$), $F(1, 118) = 402.46$, $p = .001$. Participants showed moderate levels of Bible knowledge ($M = 54\%$) and science knowledge ($M = 62\%$), and moderate agreement with the evidence-based thinking statements ($M = 6.48$). The paranormal items hung together very well ($\alpha = .92$), as did the religious beliefs ($\alpha = .95$). The Bible questions hung together acceptably well ($\alpha = .75$). The science questions had relatively poor reliability ($\alpha = .50$), although this is not surprising given the breadth of the domain. The evidence-based items also had relatively poor reliability ($\alpha = .46$), suggesting that evidence-based thinking may be a constellation of skills rather than a unitary construct. Nevertheless, as described below, these items still proved useful.

These three groups (two psychology student groups, one religious meeting group) were compared on the five indices (paranormal beliefs, religious beliefs, Bible knowledge, science knowledge, and evidence-based thinking). Because previous research has found that the relationship between religion and belief in the paranormal depends on the specific paranormal belief, comparisons were also conducted for

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1 Results were similar if adjusted for income.
2 Young earth creation, old earth creation, theistic evolution, and naturalistic evolution were treated as a four-point scale for this analysis.
3 Religious meeting participants also tended to be somewhat older, but not significantly so ($Ms = 27.37, 23.93, 23.44$, respectively), $F(2, 113) = 2.25$, $p = .110$.
4 The reliability of the evidence-based thinking index increases to .57 if the statement designed to tap an understanding of Occam’s Razor (statement 5 in Appendix A) is deleted. The results are much the same if this item is deleted.
the individual paranormal belief items. What should be expected? As described earlier, previous research suggests that both extremely religious individuals and more conservative religious individuals display lower paranormal beliefs, but some participants in this prior research may have overestimated their religious involvement. This may have had the effect of obscuring even more dramatic differences in paranormal belief. Thus, participants from the religious meeting should be low in paranormal beliefs, perhaps even lower than what has been found in research that has categorized participants using self-report measures. It should be noted that some very religious individuals, such as those who are high in intrinsic religiosity, have been found to be high in some paranormal beliefs (e.g., precognition). As such, some variability might be expected in the degree to which the religious meeting participants are lower in paranormal beliefs. In contrast, strong and consistent differences in paranormal beliefs were not expected between the two psychology student groups.

As shown in Table 1, on the five indices the two psychology student groups differed only in their religious beliefs, but the participants from the religious meeting differed from both other groups except in science knowledge, where there were no significant differences, and religious beliefs, where the meeting participants only differed from the less religious psychology students. Of particular interest, the participants from the religious meeting had lower paranormal beliefs ($M = 1.17, SD = 0.31$) than either the psychology students who reported attending services regularly ($M = 2.90, SD = 1.36$), $F(1, 72) = 41.93$, $p = .001$, or those who did not ($M = 3.29, SD = 1.75$), $F(1, 67) = 38.92$, $p = .001$.

The same pattern held in most cases with regard to the specific paranormal beliefs. For 10 of the 12 paranormal beliefs, religious meeting participants differed from both of the psychology student groups and the psychology student groups did not differ from one another. The two exceptions were the belief in crystals (that wearing crystals alters peoples’ health or behavior), where there were no significant differences, and the belief in crystal balls, where the only significant difference was between the less religious psychology student group and the religious meeting group. An inspection of the means reveals that these paranormal beliefs were endorsed to the least degree with overall means below two on a nine-point scale. Because so few people hold these beliefs, it is perhaps not surprising that significant differences were not obtained.
Table 1  Mean Differences

<table>
<thead>
<tr>
<th>Variable</th>
<th>Psychology [0 services]</th>
<th>Psychology [1+ services]</th>
<th>Religious Meeting</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paranormal Beliefs</td>
<td>3.29&lt;sup&gt;a&lt;/sup&gt;</td>
<td>2.90&lt;sup&gt;b&lt;/sup&gt;</td>
<td>1.17&lt;sub&gt;ab&lt;/sub&gt;</td>
<td>2.64</td>
</tr>
<tr>
<td>SD</td>
<td>1.75</td>
<td>1.36</td>
<td>0.31</td>
<td>1.60</td>
</tr>
<tr>
<td>Religious Beliefs</td>
<td>6.51&lt;sup&gt;ab&lt;/sup&gt;</td>
<td>7.99&lt;sup&gt;a&lt;/sup&gt;</td>
<td>8.94&lt;sub&gt;b&lt;/sub&gt;</td>
<td>7.67</td>
</tr>
<tr>
<td>SD</td>
<td>2.44</td>
<td>1.69</td>
<td>0.22</td>
<td>2.05</td>
</tr>
<tr>
<td>Science Knowledge</td>
<td>0.59</td>
<td>0.63</td>
<td>0.67</td>
<td>0.62</td>
</tr>
<tr>
<td>SD</td>
<td>0.15</td>
<td>0.19</td>
<td>0.19</td>
<td>0.18</td>
</tr>
<tr>
<td>Bible Knowledge</td>
<td>0.42&lt;sup&gt;a&lt;/sup&gt;</td>
<td>0.47&lt;sup&gt;b&lt;/sup&gt;</td>
<td>0.84&lt;sub&gt;ab&lt;/sub&gt;</td>
<td>0.54</td>
</tr>
<tr>
<td>SD</td>
<td>0.21</td>
<td>0.18</td>
<td>0.12</td>
<td>0.25</td>
</tr>
<tr>
<td>Evidence-Based</td>
<td>6.22&lt;sup&gt;a&lt;/sup&gt;</td>
<td>6.10&lt;sup&gt;b&lt;/sup&gt;</td>
<td>7.55&lt;sub&gt;ab&lt;/sub&gt;</td>
<td>6.48</td>
</tr>
<tr>
<td>SD</td>
<td>0.77</td>
<td>0.70</td>
<td>0.87</td>
<td>0.96</td>
</tr>
<tr>
<td>Astrology</td>
<td>3.30&lt;sup&gt;a&lt;/sup&gt;</td>
<td>2.87&lt;sup&gt;b&lt;/sup&gt;</td>
<td>1.46&lt;sub&gt;ab&lt;/sub&gt;</td>
<td>2.72</td>
</tr>
<tr>
<td>SD</td>
<td>2.39</td>
<td>2.03</td>
<td>1.17</td>
<td>2.13</td>
</tr>
<tr>
<td>Crystals</td>
<td>2.19</td>
<td>1.87</td>
<td>1.35</td>
<td>1.87</td>
</tr>
<tr>
<td>SD</td>
<td>1.62</td>
<td>1.47</td>
<td>1.09</td>
<td>1.48</td>
</tr>
<tr>
<td>Channeling</td>
<td>3.63&lt;sup&gt;a&lt;/sup&gt;</td>
<td>3.00&lt;sup&gt;b&lt;/sup&gt;</td>
<td>1.08&lt;sub&gt;ab&lt;/sub&gt;</td>
<td>2.80</td>
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<tr>
<td>SD</td>
<td>2.46</td>
<td>2.39</td>
<td>0.27</td>
<td>2.33</td>
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<tr>
<td>Zodiac</td>
<td>4.60&lt;sup&gt;a&lt;/sup&gt;</td>
<td>3.89&lt;sup&gt;b&lt;/sup&gt;</td>
<td>1.04&lt;sub&gt;ab&lt;/sub&gt;</td>
<td>3.52</td>
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<tr>
<td>SD</td>
<td>3.04</td>
<td>2.71</td>
<td>0.20</td>
<td>2.87</td>
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<tr>
<td>Ghosts</td>
<td>4.72&lt;sup&gt;a&lt;/sup&gt;</td>
<td>4.43&lt;sup&gt;b&lt;/sup&gt;</td>
<td>1.44&lt;sub&gt;ab&lt;/sub&gt;</td>
<td>3.85</td>
</tr>
<tr>
<td>SD</td>
<td>2.91</td>
<td>2.75</td>
<td>1.37</td>
<td>2.87</td>
</tr>
<tr>
<td>ESP [Precognition]</td>
<td>4.21&lt;sup&gt;a&lt;/sup&gt;</td>
<td>3.96&lt;sup&gt;b&lt;/sup&gt;</td>
<td>1.19&lt;sub&gt;ab&lt;/sub&gt;</td>
<td>3.42</td>
</tr>
<tr>
<td>SD</td>
<td>2.64</td>
<td>2.47</td>
<td>0.40</td>
<td>2.55</td>
</tr>
<tr>
<td>ESP [Telepathy]</td>
<td>3.63&lt;sup&gt;a&lt;/sup&gt;</td>
<td>2.96&lt;sup&gt;b&lt;/sup&gt;</td>
<td>1.11&lt;sub&gt;ab&lt;/sub&gt;</td>
<td>2.78</td>
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<tr>
<td>SD</td>
<td>2.69</td>
<td>2.06</td>
<td>0.32</td>
<td>2.29</td>
</tr>
<tr>
<td>ESP [Telekinesis]</td>
<td>2.49&lt;sup&gt;a&lt;/sup&gt;</td>
<td>2.49&lt;sup&gt;b&lt;/sup&gt;</td>
<td>1.04&lt;sub&gt;ab&lt;/sub&gt;</td>
<td>2.15</td>
</tr>
<tr>
<td>SD</td>
<td>1.74</td>
<td>1.98</td>
<td>0.19</td>
<td>1.74</td>
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<tr>
<td>Palm-Reading</td>
<td>2.63&lt;sup&gt;a&lt;/sup&gt;</td>
<td>2.23&lt;sup&gt;b&lt;/sup&gt;</td>
<td>1.00&lt;sub&gt;ab&lt;/sub&gt;</td>
<td>2.09</td>
</tr>
<tr>
<td>SD</td>
<td>2.25</td>
<td>1.89</td>
<td>0.00</td>
<td>1.91</td>
</tr>
<tr>
<td>Crystal Balls</td>
<td>1.84&lt;sup&gt;a&lt;/sup&gt;</td>
<td>1.36</td>
<td>1.00</td>
<td>1.46</td>
</tr>
<tr>
<td>SD</td>
<td>1.63</td>
<td>0.79</td>
<td>0.00</td>
<td>1.15</td>
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<tr>
<td>UFOs</td>
<td>3.88&lt;sup&gt;a&lt;/sup&gt;</td>
<td>3.26&lt;sup&gt;b&lt;/sup&gt;</td>
<td>1.26&lt;sub&gt;ab&lt;/sub&gt;</td>
<td>3.03</td>
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<tr>
<td>SD</td>
<td>2.75</td>
<td>2.21</td>
<td>0.71</td>
<td>2.41</td>
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<tr>
<td>Bigfoot</td>
<td>2.40&lt;sup&gt;a&lt;/sup&gt;</td>
<td>2.45&lt;sup&gt;b&lt;/sup&gt;</td>
<td>1.12&lt;sub&gt;ab&lt;/sub&gt;</td>
<td>2.13</td>
</tr>
<tr>
<td>SD</td>
<td>1.95</td>
<td>1.93</td>
<td>0.33</td>
<td>1.79</td>
</tr>
</tbody>
</table>

Note. Means that share a subscript are significantly different (Bonferroni).
Relationships Between Variables

Because the psychology participants and the participants from the religious meeting were quite different, correlations are presented for the entire sample and for the psychology students alone. There were probably too few religious meeting participants for representative correlations (indeed, several looked questionable, such as religious belief and service attendance being negatively correlated), so these are not presented.

As shown in Table 2, a number of interesting correlations emerged between the five indices. The number of services attended in a typical month was also included. Recent research has found attendance at services to be negatively related to paranormal beliefs (e.g., Orenstein, 2002; McKinnon, 2003) and it was in the current data as well. Religious beliefs and paranormal beliefs were not significantly correlated. However, similar to Orenstein’s (2002) findings, there was some evidence that religious beliefs and attendance at services have opposing effects. In the total sample, the correlation between paranormal beliefs and service attendance remained essentially unchanged (increased from -.51 to -.52) when religious beliefs were partialed out, but the correlation between paranormal beliefs and religious beliefs changed from -.10 to .17 when service attendance was partialed out. In the psychology sample, the correlation between paranormal beliefs and service attendance increased from -.22 to -.28 when religious beliefs were partialed out, and the correlation between paranormal belief and religious beliefs increased from .10 to .20 when service attendance was partialed out.

Bible knowledge was strongly negatively related to paranormal beliefs in the total sample (r = -.39, p = .001), but this fell to nonsignificance (r = -.13, p = .230) in the psychology sample, perhaps because there were relatively few psychology students who scored high on Bible knowledge (only three scored above the mean of the religious meeting participants). Paranormal beliefs and science knowledge were only marginally negatively related in the total sample

5 The paranormal index was unrelated to all of the individual religious beliefs as well, except one. Greater belief in the inspiration of the Bible was associated with lower paranormal beliefs, r = -.265, p = .004.

6 This negative relationship between paranormal beliefs and Bible knowledge remained significant when science knowledge, evidence-based thinking, or both were partialed out (r = -.37, p = .001, r = -.20, p = .035, and r = -.19, p = .044, respectively).
Table 2 Correlations

<table>
<thead>
<tr>
<th></th>
<th>1</th>
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<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Paranormal Beliefs</td>
<td>-.10/10</td>
<td>-.18/-17</td>
<td>-.39***/-13</td>
<td>-.55***/-42***</td>
<td>-.51***/-22&quot;</td>
<td></td>
</tr>
<tr>
<td>2. Religious Beliefs</td>
<td>-</td>
<td>-.06/-13</td>
<td>.31*/.14</td>
<td>.06/-24*</td>
<td>.44***/.38***</td>
<td></td>
</tr>
<tr>
<td>4. Bible Knowledge</td>
<td>-</td>
<td>.51*/.22*</td>
<td>.60***/.27*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Evidence-Based Thinking</td>
<td>-</td>
<td>-</td>
<td>.55***/.04</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>6. Monthly Service Attendance</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
</tbody>
</table>

Note: Correlations for the entire sample appear before the / and correlations for the psychology students alone appear after the /. *Significant at p < .05. **Significant at p < .01. ***Significant at p < .001.

(r = -.18, p = .055) and not significantly related in the psychology sample (r = -.17, p = .116). In contrast, however, evidence-based thinking was strongly negatively related to paranormal beliefs in both the total sample (r = -.55, p = .001) and the psychology sample (r = -.42, p = .001). These substantial correlations would seem to be noteworthy.

Bible knowledge was related more strongly to service attendance (r = .68, p = .001 in the total sample, r = .27, p = .011 in the psychology sample) than to religious beliefs (r = .31, p = .001 in the total sample, r = .14, p = .193 in the psychology sample). Perhaps Bible knowledge and service attendance both speak to commitment more than do religious beliefs. It was interesting to note that Bible knowledge and science knowledge were positively related (r = .35, p = .001 in the total sample, r = .37, p = .001 in the psychology sample). Finally, as one might expect, service attendance and religious beliefs were strongly related (r = .44, p = .001 in the total sample, r = .38, p = .001 in the psychology sample).

Discussion

The current work found that committed Christians were very low in paranormal beliefs. In addition, religious beliefs and paranormal beliefs were unrelated, but service attendance was negatively related to paranormal beliefs and some evidence suggested that Bible knowledge was negatively related to paranormal beliefs. The current research also found evidence-based thinking to be at odds with paranormal
beliefs. These findings would seem to have several potentially important implications, as described below.7

Religion and Paranormal Beliefs

What is the relationship between religion and belief in the paranormal? The answer to this question seems to depend on several factors, including the sample, the measure of religiosity, and the specific paranormal belief. Each of these will be discussed briefly. In the current work the two psychology college student groups did not differ for any of the 12 paranormal beliefs or for the paranormal index. This might make it appear that religion and belief in the paranormal are substantially unrelated. However, the inclusion of the participants from the religious meeting revealed quite a different picture. These conservative Christians were far lower in paranormal beliefs than either of the psychology student groups.

The participants from the religious meeting may be distinctive in at least three ways. First, as noted earlier, the church of Christ is a conservative religious group (e.g., Bainbridge & Stark, 1980), and the current participants were probably more conservative than most. For example, one of the distinguishing characteristics of the church of Christ is their determination to hold to the religious practices described in the New Testament (e.g., baptize as the New Testament church did, partake of communion as the New Testament church did). Many congregations of the church of Christ adopted multiple loaves and communion cups approximately 100 years ago, but the people at the religious meeting primarily came from congregations that continue to follow the New Testament pattern of one loaf and one cup in the communion. Second, the church of Christ is not only distinctive in being religiously conservative. A rational faith and being correct in doctrine is also emphasized. One might speculate that other religious individuals who are very devout, but who emphasize emotion, might endorse paranormal beliefs to a greater degree. Third,

7 Although potential applications are not explored in this discussion, it may be worthy of note that, just as a decline in the influence of religion in the last 50 years may be partially responsible for the skyrocketing depression rate (e.g., Seligman, 1989), a decline in the influence of religion might also lead to an increase in paranormal beliefs in society.
the participants from the religious meeting also seemed to be very dedicated with regard to religion. Not all Christians would travel some distance to attend a religious meeting, and yet many of these individuals did, testifying to their religious commitment. Other data, such as higher Bible knowledge, charitable giving, and service attendance are consistent with this characterization.

Thus, the current data lend support to the view that extremely religious individuals (at least if those extremely religious individuals are conservative Christians) tend to be lower in paranormal beliefs. Given this, should it be concluded that religious individuals are lower than nonreligious individuals in paranormal beliefs? Not necessarily. Recent research suggests that extremely nonreligious individuals (Atheists in particular) also tend to be low in paranormal beliefs (Bainbridge, 2004; see also Thalbourne & Delin, 1999). In sum, although the current research is consistent with the view that religion and paranormal beliefs are negatively related, they are also consistent with the view that the relationship between religion and the paranormal is curvilinear; both extremely religious and extremely nonreligious individuals may be low in paranormal beliefs.

The current findings also lend additional support to the view that the relationship between religion and paranormal beliefs depends on how one defines religion. Religious beliefs were not related to paranormal beliefs in the current sample, but, consistent with other recent research (e.g., Orenstein, 2002), service attendance was negatively related to paranormal beliefs and there was some evidence that religious beliefs and service attendance have opposing effects. Bible knowledge was also negatively related to paranormal beliefs, although this was only significant when the religious meeting participants were included in the analysis. Bible knowledge, like service attendance, may involve greater commitment than religious belief, and it has the advantage of being immune to social desirability concerns.

Some previous research suggests that very religious individuals are higher in some paranormal beliefs (e.g., precognition; Williams, et. al., 1989), but this was not found in the current research. One possible explanation is that the current precognition item specifically mentioned psychic abilities, whereas the items developed by Tobacyk and Milford (1983) and used by Williams and colleagues (1989) were broad enough to include biblical prophecy. No doubt the religious meeting participants would have strongly endorsed the view, for example, that the Old Testament prophets wrote accurately about
Jesus Christ, but that would probably be better characterized as a religious belief than a paranormal belief. Although the current religious meeting participants certainly believed in the supernatural (e.g., God, the devil, the resurrection of Jesus Christ, creation), they drew a marked distinction between God's miracles and paranormal claims. Research suggests that experts make more fine distinctions (e.g., Johnson, & Mervis, 1997; Tanaka, Curran, & Sheinberg, 2005). To the degree that extremely religious individuals know more about their religion (the religious meeting participants did, as evidenced by their greater Bible knowledge), they may be in some sense experts, and so may strongly believe in biblical miracles while simultaneously strongly disbelieving the paranormal claims of palm-readers and psychics. Thus, although the belief in the supernatural that is part and parcel of many religious views may have some commonalities with a belief in the paranormal (e.g., Wuthnow, 1978), greater knowledge of religion (at least of Christianity) may immunize people against paranormal beliefs.

Evidence-Based Thinking and Paranormal Beliefs

As described earlier, researchers have learned that a number of variables that one might think would be at odds with paranormal beliefs (e.g., science knowledge, logical reasoning, Need for Cognition) do not seem to be. However, some research suggests that critical thinking (Gray & Mill, 1990) and scientific reasoning (Hoekstra et al., 2003) are negatively related to paranormal beliefs. The current findings for evidence-based thinking are consistent with this. Thus, it appears that critical thinking skills, rather than simply knowledge (e.g., science knowledge) or an enjoyment of thinking (e.g., Need for Cognition), tend to reduce belief in astrology, palm-reading, and UFOs. No doubt this is consistent with what many academicians have observed anecdotally. Although educational attainment can be negatively related to paranormal beliefs (e.g., Sparks & Miller, 2001), probably only certain aspects, perhaps those that pertain to reasoning rather than knowledge, are involved (e.g., Mill et al., 1994).

Another possibility is that a college education at a secular university tends to foster a secular worldview, which may be philosophically incompatible with paranormal beliefs. In the current sample, number of college credits was negatively related to paranormal beliefs ($r = -.28, p = .002$), even controlling for age ($r = -.26, p = .005$), but GPA was unrelated ($r = -.13, p = .17$).
**Future Directions**

Although the current work produced some interesting findings, it also raises some interesting questions. For example, why did the Christians from the religious meeting display a low degree of paranormal belief? There would seem to be at least three possibilities. One possibility is that religious beliefs and paranormal beliefs may serve similar functions (e.g., Emmons & Sobal, 1981). If so, a person high in one might feel no need for the other, producing a negative relationship. A second possibility is that a biblical worldview may be incompatible with many paranormal beliefs. Astrology, crystals, ESP, and the like seem to spark of New Age beliefs. Perhaps then, conservative Christians reject the paranormal for the same reason they reject New Age theology, that it is incompatible with the Bible. Consistent with this, Bible knowledge remained negatively correlated with paranormal beliefs even after evidence-based thinking and science knowledge were partialled out. Yet a third possibility is that a biblical worldview may be incompatible with paranormal beliefs for the same reason that evidence-based thinking appears to be incompatible. Although some skeptics might find it surprising, the Bible encourages several types of critical thinking. For example, Christians are encouraged to Test everything. Hold on to the good. (1 Thessalonians 5:21, NIV). Consistent with this, the Christians from the religious meeting were not only lower in paranormal beliefs, but also higher in evidence-based thinking. These issues would seem to be worthy of additional research.

It may also be interesting to consider why Atheists also seem to be low in paranormal beliefs. Perhaps their disbelief serves functions (e.g., purpose in life) such that they feel no need for either religion or the paranormal. Anecdotally, it certainly appears that some Atheists dedicate much of their lives to promoting their perspective. Or, perhaps their worldview is incompatible with any belief that does not conform to naturalism. If so, they might disbelieve anything supernatural, but believe ideas that possess the trappings of science, even if those ideas are not based on evidence (such as some aspects of the theory of evolution; e.g., Behe, 1996; Dembski, 2002). Finally, they might have critical thinking skills that allow them to spot charlatans. These possibilities might also be worthy of the attention of researchers.

In conclusion, the current work provides additional evidence that very religious conservative Christians tend to disbelieve the paranormal. Evidence-based thinking also seems to be at odds with paranormal
beliefs. These findings would seem to be of value to scientists of religion, to social scientists in general, and to others who are concerned about the influence of paranormal beliefs in society.

Appendix A

1. When people make a surprising claim, it is always a good idea to have a neutral, objective person check the facts. (−.16/−.21)
2. Evidence is more important to consider than the opinions of people, even if those people are authorities. (−.08/.01)
3. If an expert suggests that something is true, we should believe it, even if it seems surprising. [Reversed] (.23*/.13)
4. If you want to decide which of two views is better, it is a good idea to consider the evidence for both sides. (−.25**/−.23*)
5. When two views fit the evidence equally well, one should choose the simpler one. (−.11/−.09)
6. On issues where there is disagreement, a good way to get at the truth is to take a poll to determine which position the majority of experts believe. [Reversed] (.28**/.14)
7. The best ideas are those that cannot be tested, because then no one can prove you wrong. [Reversed] (.30**/.21*)
8. People should be able to explain to others why they hold the views that they do. (−.30**/−.20)
9. People should believe whatever they want to believe, even if it goes against the evidence. [Reversed] (.36***/.11)
10. Ideas are not very useful unless there is a way to determine whether or not the ideas are true. (−.25**/−.12)

Note: For the benefit of interested researchers, for each statement the correlation with the paranormal beliefs index is given in parentheses (Total sample/Psychology students). * Significant at p < .05. ** Significant at p < .01. *** Significant at p < .001.
References


