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A TALE OF TWO THEISTIC STUDIES: ILLUSTRATIONS AND EVALUATION OF A POTENTIAL PROGRAM OF THEISTIC PSYCHOLOGICAL RESEARCH

Jeffrey S. Reber, Brent D. Slife, and Samuel D. Downs

ABSTRACT

Two empirical research studies are described that illustrate the potential value of joining conventional social science and theistic religion in a theistic program of psychological research. The first study shows how a theistic program of psychological research tweaks the existing psychological research on the formation of God attachment to include a new assessment, experiences of God. The results of Study 1 indicate that experiences of God are an important predictor of theists' attachment to God, even when controlling for parental attachment. The second study exemplifies how theistic ideas can lead to a new program of psychological research, in this case research on implicit attitudes toward faith and science, and can generate new scientific instruments such as the modified Implicit Association Test used in this study. The results of Study 2 suggest that education and training in psychology may lead theistic psychology students to implicitly endorse a secular stereotype that they consciously reject. Implications of the findings of both studies are discussed and the heuristic value of a theistic program of psychological research is explored.

Keywords: Theistic psychology, God image, faithism, religion, prejudice, research

In this paper, we are interested in describing two examples of a theistic approach to psychology that have produced rigorous empirical and quantitative research. Conventional science and theistic religion have long been considered relatively independent of one another (e.g., Dixon, 2008), but we would like to show how this traditional chasm can be bridged. To be sure, the scientific method has been used to investigate the religious in fields like the psychology of religion. Yet, these investigations still consider science and religion to be ultimately independent because religious ideas are not typically used to frame the hypotheses or explain the data. Here we show in these two examples how conventional social science and theistic religion can truly be joined.

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The first example shows how existing research can be tweaked to produce this joining. One would think that psychological research on people's representations of God had already effected this joining, but to this point, researchers have rarely considered theistic hypotheses or explanations in their research on people's God image (e.g., O'Grady & Richards, 2008). We describe how a theistic program of research suggests empirically testable theistic hypotheses that have been mostly overlooked by conventional psychological researchers, such as the hypothesis that theists' experiences of God contribute to the development of their God image.

The second example shows how theistic ideas can lead not only to a whole new program of research but also to the development of new scientific instruments. Psychologists have long been interested in implicit attitudes and beliefs and their effects on each other and on behavior (Gawronski & Payne, 2010). A theistic approach to psychology suggests a host of as yet uninvestigated studies in this important research area. As one illustration, we describe the preliminary results of an empirical study that examines the impact of education and training in psychology on theists' implicit theistic and naturalistic attitudes and beliefs.

Example 1: The God Image

As we have described (Slife, Reber & Lefevor, this issue), a theistic worldview assumes that God is actively and currently involved in psychological phenomena in a difference making way. This assumption opens the theistic psychologist up to aspects of psychological phenomena and ways of studying them that have rarely been considered. One such phenomenon is the development of theists' God image. Conventional God image researchers assume that theists' early childhood experiences with parents and other authority figures are a significant contributor to the development of their representations of God (Reinert & Edwards, 2009). However, they often exclude experiences with one important authority figure for theists, God, even though these experiences might also contribute to the development of theists' God images (e.g., Cassibba, Granqvist, Costantini, & Gatto, 2008). The thoroughgoing theist, on the other hand, is explicitly interested in experiences of God and would form a hypothesis to test whether and to what extent experiences with God predict theists' God images. The test of this hypothesis, as we will illustrate, could closely follow the methodology already used in conventional God image research, with a few modifications.

Methodology

Given attachment theory's emphasis on experiences with parents, the methodology typically used in God image research relies primarily on self-reports of childhood experiences and parental attachment. That is, using either an interview (e.g., the Adult Attachment Interview) or a survey (e.g., Parental Attachment Measure) God image researchers gather data about participants' experiences with their parents. They then examine those experiences in order to assess the extent to which they were positive or negative and indicative of a secure or insecure parental attachment style. They also assess participants' God image, typically using a self-report instrument like the God Attachment Measure to examine whether the participants' God image is more positive or negative, secure or insecure. Then, they correlate the two measures to test the extent to which parental attachment predicts God attachment. If there is a significant positive correlation, the researchers typically conclude that the hypothesis has been supported that experiences with parents, which develop a secure or insecure parental attachment style, contribute to a similar style of attachment to God and a God image that is consistent with the image of one's parents and other authority figures.

In researching this topic, conventional researchers typically have not included the possible role that experiences of God might play in the development of theists' attachment to God. Their reasons for leaving this potentially important variable out of their studies are rarely explained or justified by a methodological rationale. Lawrence (1997), for example, simply asserted without any empirical support or theoretical explanation that "the God representation . . . is not based directly on experiences of God" (p. 214). O'Grady and Richards (2008) have closely reviewed the God image literature looking for something more than Lawrence's just-so assertion. They came to the conclusion that "this neglect seems to come from an underlying atheistic presupposition that because God is not real, a real relationship with him could not possibly be part of the explanation of God image formation" (p. 189). Slife and Reber (2009a) have also critically examined this exclusion of experiences of God and trace the omission of experiences of God to the naturalistic worldview underpinning conventional psychological research.

Given that the exclusion of experiences of God appears to be based primarily on the worldview of the researchers conducting the study and not on the basis of a methodological justification, we decided to include experiences of God in our God image study. In our own consideration

of this research variable, we could see no in principle methodological reason for excluding reports of one set of experiences and including the other. Participants' reports of their experiences of God are as describable, measurable, and statistically analyzable as their reports of experiences of parents or any other experience. By including experiences of God as a research variable in our study, we were able to evaluate the extent to which experiences of God correlate with theists' attachment to God just as conventional researchers examine the degree to which experiences of parents correlate with attachment to parents.

The Current Study

In light of the theoretical and methodological parallels and modifications just described, we have conducted a theistic psychological study that investigates the extent to which theistic participants' attachment to God is positively correlated with their personal experiences with God. Specifically, we hypothesized that experiences with God account for a significant percentage of the variance in participants' attachment to God, even when controlling for the variance accounted for by parental attachment. Results confirming this hypothesis would suggest that experiences with God could be a necessary factor in theists' development of their attachment to God, which, together with parental attachment, accounts for a large portion of the variance in the phenomenon.

Participants. Eighty-five undergraduate students who self-identified as theistic were recruited for participation in this study from two private religious institutions, Brigham Young University and Trinity International University. The average age of participants was 20.5 and 66% of the participants were female. Fifty-three percent of the participants (all from BYU) self-identified as Latter-Day Saint (LDS), 8% indicated that they were protestant Christian, 29.4% listed their religion as evangelical Christian, and 9.4% self-identified as "Other."

Instruments. Three instruments were used in this study: the Parental Attachment Measure (PAM), the God Attachment Measure (GAM), and the Experiences with God Measure (EGM).

The PAM is a retrospective self-report measure of parent-child attachment modified from Collins and Read's (1990) Adult Attachment Measure and Hazan and Shaver's (1987) adult attachment descriptions. The PAM and the instruments from which it was developed are designed to assess participants' adult attachment styles, which Bowlby (1973) asserted, "are

tolerably accurate reflections of the experiences those individuals have actually had" (p. 235). The PAM consists of 18 Likert-type items evenly divided into three subscales: dependence, anxiety, and closeness. The dependence subscale measures the participants' perceived ability to rely on their parents with higher scores indicating more dependence. The anxiety subscale measures feelings of uncertainty about being loved and/or abandoned and is reverse scored with higher subscale scores indicating less anxiety about the relationship. The closeness subscale measures the warmth of the relationship with parents with higher scores indicating a closer relationship. The items for each subscale are summed together for a subscale score. The subscales may also be totaled for an overall measure of parental attachment with higher scores indicating more secure attachment. The PAM has a Cronbach's reliability coefficient of .84.

The GAM is a modification of the PAM that is designed to assess participants' attachment to God using the same questions as the PAM with the references to parents replaced with references to God. As with the PAM, the GAM consists of 18 Likert-type items evenly divided among three subscales (dependence, anxiety, and closeness) that are scored and totaled in the same manner as the PAM. The GAM has a Cronbach's reliability coefficient of .82. Both the PAM and GAM have been used in several previously published peer-reviewed research articles.

The EGM was created for the purposes of this research as a self-report measure of participants' experiences with God. A research team consisting of a professor, a graduate student, and three undergraduate students generated the items for the instrument. Each person came up with 10 possible items that were compiled into a larger list. The team met together to remove any redundant or confusing items and reduced the number of items to 18. The wording of each item was adjusted to make sure it was similar to the wording of the items used by parental attachment researchers to examine experiences of parents.

Similar to the PAM and GAM, the items were formatted into a Likert-type scale with "*never*" and "*frequently*" as anchors. The items were then reviewed by a sample of students in the professor's psychology course to ensure clear wording and fit with their experiences of God. Examples of the items included in the final instrument include: "I have experienced God comforting me when I am sad," "God has touched my heart," and "I have experienced God's presence when I worship." Four items concerning negative experiences with God were also included, such as "I have experienced God's anger toward me." These four items were reversed scored

and summed with the other 14 items for a total score derived from 18 total questions. Higher scores on the EGM indicate more positive experiences with God. The 2-week test-retest reliability of the EGM is .88.

Procedure. Participants were provided with a hyperlink to the online survey. After giving consent each participant took the survey, which consisted of four parts: a demographics questionnaire, the PAM, the GAM, and the EGM. The survey took approximately 10 minutes to complete. Following their completion of the survey, participants were debriefed and thanked for their participation.

Results

PAM/GAM correlation. Consistent with the findings of previous research, we found a moderate, positive correlation between participants' overall scores on The PAM and their overall scores on the GAM (see Table 1). Correlations for all subscale scores were also significant. These findings support the hypothesis that parental attachment is a moderate predictor of theists' attachment to God and that specific styles of attachment to parents are significantly correlated with the specific forms of attachment to God. Following the common practice for statistically determining the variance contributed by each measure to the correlation between all measures (Baba, Shibata, & Sibuya, 2004), we then conducted a partial correlation analysis. A partial correlation analysis determines the portion of the variance in the PAM-GAM relationship that is accounted for by PAM by statistically removing the variance in the PAM-GAM correlation that is accounted for by the EGM measure.

The results of the partial correlation analysis show that when you control for the variance in the PAM-GAM correlation that is accounted for by EGM, the correlation between PAM and GAM reduces by 26%, and the variance in the PAM-GAM relationship that is accounted for by PAM, when controlling for the effects of EGM, is cut by almost half. This suggests that although parental attachment is a predictor of God attachment and is a necessary condition for understanding God attachment, it is probably insufficient to explain God attachment. It may even be the case that the prediction power of parental attachment is attenuated by experiences with God. Further analyses will help us better interrogate this possibility.

EGM/GAM correlation. Consistent with the theistic hypothesis of this study, results show that there is a strong, positive correlation between respondents' overall EGM scores and their overall GAM scores, and EGM

Table 1. *Bivariate and Partial Correlation Coefficients of Parental Attachment Measure (PAM), God Attachment Measure (GAM), and Experiences with God Measure (EGM), with Variance Estimates.*

Correlated Measures	Bivariate Correlation (r)	r^2	Variable Controlled	Partial Correlation (r)	r^2	Variance Reduced
PAM-GAM	.38**	.14	EWG	.28*	.08	43%
PAMdep-GAMdep	.41**	.17		.28*	.08	53%
PAManx-GAManx	.40**	.16		.34**	.12	25%
PAMcls-GAMcls	.32**	.10		.21	.04	33%
EGM-GAM	.52**	.27	PAM	.47**	.22	19%
EGM-GAMdep	.74**	.55	PAMdep	.70**	.49	11%
EGM-GAManx	−.52**	.27	PAManx	−.49**	.24	11%
EGM-GAMcls	.54**	.29	PAMcls	.49**	.24	17%
PAM-EGM	.27*	.07	GAM	.10	.01	86%
PAMdep-EGM	.32**	.10	GAMdep	.02	.00	100%
PAManx-EGM	−.22*	.05	GAManx	−.02	.00	99%
PAMcls-EGM	.29**	.08	GAMcls	.14	.02	75%

*$p < .05$ **$p < .01$

is also a strong predictor of participants' GAM subscale scores (see Table 1). This supports the idea that experiences with God are strongly associated with theists' attachment to God and their particular form or style of attachment. In order to determine the proportion of variance in the EGM-GAM relationship that can be accounted for by EGM with the effects of PAM on the EGM-GAM correlation statistically removed, we conducted a partial correlation.

Results show that there was only a slight decrease in the variance accounted for in the EGM-GAM relationship by EGM when the effects of PAM are removed, indicating that the EGM is a significant predictor of GAM with or without the variance contributed by PAM to that relationship. These findings suggest that experience with God may be a necessary factor in the development of theists' attachment to God in its own right. That is, its predictive utility with regard to theists' attachment to God appears to be largely undiminished by the inclusion or exclusion of parental attachment. A final analysis will help determine whether this is likely the case.

PAM/EGM correlation. To fully interrogate the relationship among these three measures and to better understand the contribution of EGM to GAM, it is necessary to examine the relationship of the predictor variables, PAM

and EGM. If the correlation between these two measures is high and if the variance accounted for in the relationship between the PAM and EGM is not due primarily to each variable's relationship to GAM, then it is possible that the measures are not that different. In other words, it could be, as conventional researchers have suggested, that experiences with God are strongly influenced by or even developed out of parental attachment. To examine this possibility we correlated participants' overall EGM scores and their composite PAM scores, as well as the PAM subscale scores.

The overall correlation between the two measures was small and positive but significant (see Table 1). However, a partial correlation analysis, which controls for the variance in the PAM-EGM relationship that is due to the GAM, shows a significant decrease in the PAM-EGM correlation. Indeed the correlation drops to insignificant levels. This means that only 1% of the variation in the PAM-EGM correlation can be accounted for by PAM or EGM when the variance in the relationship accounted for by GAM is statistically removed. This suggests that theists' experiences with God and parental attachment are not directly associated with each other. Each phenomenon appears to be related to the other only by virtue of their each being related to God attachment.

Discussion

The results of this study suggest at least three potentially valuable contributions to the God image research literature. First, they support the hypothesis that experiences of God are strongly associated with theists' attachment to God; not as a derivative of parental attachment but as a particular and particularly strong predictor of theists' attachment to God. Second, they support the methodological claim that experiences of God are as assessable as experiences of parents and any other experiences. Granted, the EGM is an initial foray into the development of instruments that could measure these experiences and will need further validation in future research studies before it can become a vetted measure. However, this statement could be said of any new psychological measure that is being developed and tested. We hope other researchers will test the EGM and develop additional measures, both quantitative and qualitative, that can more fully interrogate and validate the assessment of this important phenomenon. At the very least it will be important to identify which types of experiences of God are most predictive of particular attachment styles, something that was not studied in this research, but would better parallel the parental attachment instruments that have been developed.

Third, the results of this study add support for a theistic form of attachment theory. That is, the findings seem to indicate that attachment theory could be reasonably and productively adapted to an understanding of theists' relationship to God, a relationship that for theists is just as real and important, if not more so, than their relationship to their parents. Our study does suggest that experiences of God might contribute to God attachment in much the same way that experiences of parents appear to contribute to parental attachment. Why not develop a theistic theory of attachment to frame theistic psychologists' understanding of this phenomenon and to generate additional hypotheses to test various aspects of the theory? Such an approach falls right in line with conventional researchers' conceptualization of a scientific program of psychological research.

Example 2: Implicit Theistic and Naturalistic Attitudes

We have just reviewed a study that illustrates how a theistic worldview opens up new possibilities for studying and theorizing about a topic that has been the focus of a great deal of conventional research. Now, we will review a study that illustrates how a theistic worldview opens up possibilities for developing entirely new programs of research, investigating psychological topics that have been overlooked by conventional researchers and that promote the development of new scientific instruments and theories. One example of a new program of research that we are currently developing investigates the effects of implicit attitudes and beliefs about naturalism, theism, and the relationship between the two.

We have discussed in our theoretical paper in this special issue and elsewhere (Reber, 2006; Slife & Reber, 2009a; Slife, Reber & Faulconer, in press) the widely held secular assumption that science is an objective and unbiased method of investigation, and faith is a subjective perspective that differs among religions and individuals and can lead to biased perceptions and explanations (for examples of this assumption see Helminiak, 2010 and Alcock, 2009). We have also traced this secular assumption to the *myth of neutrality* (Flashing, 2010) that often accompanies the naturalistic worldview, which is "the central dogma of science" (Leahey, 1991, p. 379). Finally, we have challenged the myth of neutrality by showing that naturalism and theism are distinct worldviews built on alternative sets of assumptions that lead to different implications for how psychologists understand people, the world, and God. Put in the simplest terms, the naturalistic worldview assumes that God is not necessary to psychological

explanation, and a thoroughgoing theism assumes that God is necessary. Given this fundamental incompatibility, we conclude that naturalism is not neutral with regard to theism.

To support our conclusion, we have described some of the historical effects of psychology's adoption of the naturalistic worldview on theism, including the exclusion of God from psychology texts; method practices that discriminate against including theistic hypotheses, measures, and explanations; and the omission of theism from theistic theories that are adopted into psychology (Slife & Reber, 2009a). We have also shown that when theistic concepts are omitted, they are replaced by naturalistic explanations and conceptions (Slife & Reber, in press). In this sense, naturalism does not just exclude God but fosters a replacement worldview. In considering these and other potential consequences of naturalism for theism, we have also wondered whether psychology's adoption of naturalism might have demonstrable effects on theists' beliefs and attitudes, including the beliefs and attitudes of theistic psychologists (Reber, 2006; Slife & Reber, in press). In developing this study, we specifically wondered whether education and training in psychology might have an effect on theistic students' attitudes and beliefs about theism and naturalism. Following our theoretical work on the relationship of naturalism and theism (Slife & Reber, this issue; 2009a; 2009b) we decided to examine whether theistic students' implicit attitudes and beliefs would become more naturalistic as a consequence of their training and education in scientific psychology. More precisely, we tested the hypothesis that their implicit theistic attitudes and beliefs would become more naturalistic as their education and training in psychology increased, as evidenced by their greater unconscious acceptance of the secular stereotype that science is objective and fair and faith is subjective and biased.

Researchers have long been interested in the relationship between higher education and students' religiosity more generally. Early research in this area strongly suggested that students' religious practices and beliefs declined as their college education increased (e.g., Caplovitz & Sherrow, 1977). By 1983, the finding seemed so compelling and consistent that the sociologist Hunter boldly concluded, "It is a well-established fact that education, even Christian education, secularizes" (p. 132). More recently, researchers have been much more circumspect about drawing these conclusions. Some have even found in studies of more current datasets (e.g., Lee, 2002) and meta-analyses based on research from the last two decades (e.g., Pascarella & Terenzini, 2005) that at least since 1990, there has been

a consistent finding that most students' religious convictions actually increased during college.

In fact, sociologists Uecker, Regner, and Vaaler (2007) found that young adults who did not attend college were significantly more likely to attach less importance to religion since adolescence than young adults who are currently enrolled in college or who have earned a college degree. Uecker et al. (2007) did find that some religious practices tend to decline during college, such as church attendance, but "the religious belief systems of most students go largely untouched for the duration of their education" (p. 1683). Based on their review of the literature and their own findings, Uecker et al. concluded that "a college education is not the secularizing force we presumed it to be" (p. 1683). According to researchers Albrecht and Heaton (1998), this conclusion is especially true of young adult Mormon college students (the population of interest in our study), most of whom attend one of BYU's three campuses and whose explicit religious beliefs, attitudes and even practices, like church attendance, appear to increase during college.

It is important to note that virtually all of these findings have to do with conscious and explicit attitudes and beliefs. Recent research on prejudices and stereotypes, however, distinguishes between explicit and implicit attitudes, with the latter being prejudicial or biased even when the former are not (Blair, 2001). Based on this literature and the findings previously described, we hypothesized that the theistic students in our study would begin college with explicit attitudes that are favorable toward theism and that there would be no significant change in explicit attitudes as education level and class change. However, their explicit attitudes do not tell the whole story. As we have asserted in this special issue and elsewhere, it is psychologists' implicit theistic attitudes which are more likely to be influenced by the naturalistic worldview and its secular implications (e.g., Slife & Reber, 2009a, 2009b). Consequently, consistent with the implicit stereotype and prejudice research, we expect our theistic sample to explicitly reject the secular stereotype across all education-levels and class standing while implicitly becoming more accepting of the stereotype as their education and training in psychology increases.

The Study

If, as we have argued (Slife, Reber & Lefevor, this issue), psychology's naturalistic method assumptions are not neutral toward theism, then it is reasonable to assume that these assumptions are a kind of hidden

ideology of its own and thus might have demonstrable effects on alternative beliefs and attitudes, such as those of theistic psychology students, particularly their implicit beliefs and attitudes. We focus our hypotheses on implicit theistic attitudes and beliefs because explicit attitudes and beliefs tend to be consciously controlled and may reflect the social and religious norms of the university environment where the students are located. The psychology students who participated in this study are all enrolled at Brigham Young University, a private religious institution of higher education, and are all members of the LDS church, with the vast majority attending at least 4 years of LDS seminary education. Given the natural religious pressures of an institution like BYU and its supporting church, it is highly likely that participants' explicit attitudes with regard to theism and naturalism will reflect public conformity with the religious norms and values of the broader institutional culture.

Implicit attitudes and beliefs, on the other hand, tend to be more unconscious and therefore are less likely to be controlled by the conscious mind and are less likely to reflect public conformity with the norms and values of the broader religious culture. At the same time, because these students are actively religious members of the LDS church and have chosen to attend a university supported by that church, we thought it highly likely that their implicit attitudes about theism at the beginning of their education in psychology would be favorable. In this sense, studying a theistic population would allow us to effectively test whether and to what extent participants' implicit attitudes might change from being initially more favorable toward theism to being more favorable toward naturalism near the end of their educational experience.

IAT

Researchers have long been interested in the role implicit attitudes and beliefs play in human thought, feelings, and actions. However, they have also had to be quite creative in developing instruments that would bypass or get behind the controlled attitudes that people explicitly express. In 1998, Greenwald, McGhee, and Schwartz introduced an instrument that they believed can be used to examine implicit attitudes and beliefs, the Implicit Association Test (IAT). Initially designed to examine implicit stereotypes, biases, and prejudices, the IAT has been used in thousands of studies to examine hundreds of topics across a variety of domains (Project Implicit, 2011). It has also been subjected to numerous tests of reliability and validity and used in several meta-analyses (e.g., Greenwald,

Poehlman, Uhlmann & Banaji, 2009; Nosek, Greenwald & Banaji, 2005). It appears to be a very rigorous method of examining automatic thoughts and feelings and has become the primary instrument psychologists use to study implicit attitudes and beliefs (Nosek, Greenwald & Banaji, 2007).

How does the instrument work? The basic premise of the instrument is that the speed of response with which a word is sorted into its proper category will differ, on the average, in trials where the category label is paired with another category label that is stereotypically associated with it (e.g., insect and bad) as opposed to trials where the category label is paired with another category label that is not stereotypically associated with it (e.g., insect and good). The assumption is that it should take longer to correctly sort words when the category labels are paired in the nonstereotypical way than the stereotypical way, indicating an implicit preference toward the stereotypical category pairing. The IAT used in this study follows this same standard procedure that Greenwald and his colleagues have developed and has been tested and validated numerous times (Greenwald, Nosek & Banaji, 2003). However, in order to examine implicit attitudes favoring theism or naturalism, we modified the IAT category labels and sorting words to test whether theistic psychology students come to implicitly adopt the popular secular stereotype that faith is biased and subjective and science is fair and objective as their education and training in psychology increases. Details of our modification are fully described in the instrument section.

Method

Participants. Two hundred seventy-seven participants were recruited to participate in this study. Undergraduate students were recruited from psychology courses offered at BYU. Graduate students in psychology and psychology department faculty were recruited via an email requesting their participation. Participant ages ranged from 17 to 64 years with an average age of 22.49. Just slightly over half of the participants were female (52%), and 98% indicated that they currently believed in God.

It is important to note that although most students at BYU are theistic and LDS, their education and training is similar to that of students at other comparable institutions. The psychology department curriculum conforms closely to the recommended curriculum for psychology majors published by the American Psychological Association (2007). Graduate students also follow a curriculum that is APA accredited. Faculty have been educated in APA accredited doctoral programs at universities that

adhere to the APA guidelines for psychology education, and the texts they use in their courses are widely used across the discipline.

This strongly suggests that the education and training of the sample used in this study is not different from that of other institutions. Teachers are encouraged to integrate faith in their teaching, but there is no consistent way in which this is practiced or monitored. If anything, the integration of faith and teaching should work to support the implicit theistic attitudes of the participants, making them more resilient to change as a result of their exposure to psychology education. It should also be noted that the psychology degrees offered at BYU are scientific degrees (BS, MS, and Ph.D.), indicating that the scientific method is strongly emphasized by the department. For example, all undergraduate majors have to complete a set of four fairly standard courses in psychological statistics, research methods, measurement, and scientific writing that is strongly oriented toward scientific methods.

Procedure. After signing up to participate, participants were sent a link to the study that they could complete online when they had the time and privacy to complete the study in a comfortable and attentive manner. After opening the link and completing the consent form, a new window opened with instructions for completing the modified IAT. The instructions used were essentially the same as the instructions used in Greenwald et al.'s (2003) standard application of the IAT. After reading the instructions, the participants hit the space bar and the study began. Following completion of the IAT, the participants received their difference score and were informed that their score indicated either a strong, moderate, mild, or no preference for science over faith or for faith over science. Following the completion of the IAT, participants closed the window and responded to a demographic questionnaire and a 20-item explicit attitudes about faith questionnaire designed to assess participants' explicit attitudes towards faith and people of faith compared to science. After the participants completed the explicit attitudes questionnaire, a message appeared on the screen that thanked them for their participation and debriefed them. After reading the debriefing the study was complete, and the participants closed the window.

Instruments. There were two instruments used in this study: an explicit attitudes about faith measure and an implicit attitudes about faith measure, which is a modification of the IAT.

Explicit Attitudes about Faith: In order to examine participants' agreement with the stereotype that people of faith are prone to bias and subjectivity, and scientists are objective and fair, we first examined the research literature to see if any other instruments had been developed and used to

examine this belief. In our review of the social science literature on this and related topics, we could find no study that used an instrument of any type designed to measure explicit attitudes toward faith and people of faith, and no instrument specifically focused on the stereotype of interest in this study. There were several instruments that measured negative attitudes among the religious directed toward the non-religious or toward different religions but none that looked at stereotypes or negative attitudes directed toward religion or faith in general and certainly none toward theism. Consequently, we designed our own instrument to assess this as yet untested construct. We developed 20 questions that examined attitudes toward faith and in several cases used wording that contrasted attitudes toward faith with attitudes toward science, which was consistent with the format of the IAT used in this study.

The first step in the process of developing the questions was to brainstorm about possible items that examine the stereotype that associates faith with bias and science with fairness. A large list was compiled by each of the participants on the research team, which included two faculty, two graduate students, and five undergraduate students. The research group then narrowed the number of items by removing redundant items and items that might confuse participants or not fit the stereotype. The resulting 20 items were then pretested for test-retest reliability over a two week period (Cronbach's alpha = .88). Given that there were no other measures that explicitly tested the stereotype or attitudes toward faith and people of faith generally, we could not conduct validity tests.

Implicit Attitudes about Faith: The IAT used in this study was an adaptation of the standard IAT format used for implicit prejudice studies. The four category labels that were used in this study were *Science, Faith, fair*, and *biased*. The selection of these category labels reflects the popular secular stereotype that science is an objective and value-free method that is neutral with regard to other worldviews and faith is a subjective perspective that differs among religions and individuals and promotes bias. In this way, our implicit and explicit measures assessed the same secular stereotype using different but comparable methods.

Following the standard procedure for administering the IAT, the IAT used in this study consisted of seven trials. The first two trials were learning trials designed to teach participants which words belong to which categories. The first trial presented "Science" and "Faith" on opposite top corners of the computer screen. A word (e.g., experiment) flashed in the middle of the screen, and the participants assigned it to the proper category (Science) as quickly as possible. All twenty words that belonged to the category of "Science" or "Faith" were randomly ordered and

presented to the participants for sorting. The second trial presented the category labels "fair" and "biased" on opposing top corners of the screen. Each of the 20 words that belonged to those two categories was randomly selected and presented to the participants for sorting.

The third and fourth trials presented the category labels paired together in the stereotypical format with "Science" and "fair" listed together on one side of the screen and "Faith" and "biased" paired together on the other side. In the third trial, 20 words were randomly selected from the 40 words from all four categories. In the fourth trial, all 40 words were presented for sorting in random order. The average speed with which participants hit the key associated with the proper location of the category label was recorded across the two trials. In the fifth trial (another learning trial), the categories "Faith" and "Science" were presented, but their location on the top corners of the screen was reversed. All 20 words associated with those category labels appeared in the middle of the screen for sorting in random order. For trials six and seven, the category labels "fair" and "biased" were added to the top corners of the screen in their original locations, so now in the nonstereotypical manner "Science" and "biased" appeared on the same side and "Faith" and "fair" appeared on the other side. In the sixth trial, 20 of the 40 words were randomly selected and presented on the middle of the screen for placement in the proper category. In the seventh trial, all 40 words appeared and were sorted. Average speed of response was recorded across both trials and compared to the average response speed for trials three and four.

A difference score (d) was calculated for each participant. A positive difference score indicated that participants took longer to properly assign words to categories when the words were paired nonstereotypically than when category labels were paired stereotypically, suggesting a more naturalistic attitude. A negative score indicates that the participant took longer to assign words to their proper categories when the words were paired stereotypically than when they were paired nonstereotypically, suggesting a more theistic attitude. A score at or near zero indicated no difference in speed of accurate response and suggested no preference for naturalism or theism.

Results

Explicit attitudes. As a check on our hypothesis that explicit attitudes about faith were unlikely to reveal any change from theistic attitudes toward naturalistic attitudes, we first examined the results of the Explicit

Attitudes about Faith measure. Descriptive statistics revealed that participants' scores on this measure were primarily at the lower end of the points possible for the total. With a range of possible total scores from 20–140, with 20 representing very strong disagreement with the naturalistic stereotype and 140 representing very strong agreement with the naturalistic stereotype and 80 as the midpoint (neither agreeing nor disagreeing with the stereotype), the average total score across all respondents was 58.64 (SD = 11.66) which falls closest to the *disagree* score on the measure. This indicates that on average, participants disagreed with the naturalistic stereotype that science is fair and faith is biased.

Inferential tests (one-way ANOVA) were conducted to see if participants' explicit attitudes about faith differed according to their educational level (e.g., bachelor's degree) and class standing (e.g., freshman). Omnibus tests found no significant differences overall for each variable suggesting, as we predicted, that explicit attitudes about the naturalistic stereotype do not change as education and training in psychology increases (see Table 2).

Table 2. *Descriptive and Inferential Statistics for Education Level and Class by Explicit and Implicit Attitudes about Faith.*

Level of Education	Explicit Attitude		IAT score	
	Mean	*SD*	*Mean*	*SD*
High School Degree (n = 8)	56.63	14.12	−.47	.23
Associate's Degree (n = 28)	55.39	11.58	−.38	.33
Some College (n = 183)	58.86	11.91	−.19	.42
Bachelor's Degree (n = 25)	57.72	10.05	−.15	.54
Graduate School (n = 12)	63.17	8.79	.10*	.26
Master's Degree (n = 8)	59.50	9.12	.21	.54
Doctoral Degree (n = 5)	64.20	15.42	.31	.42
Omnibus ANOVA Test	**$F(6, 261) = .94, p = .47$**		**$F(6, 262) = 4.98, p < .001 \ \eta_p^2 = .10$**	
Class Standing	Mean	SD	Mean	SD
Freshman (n = 55)	60.69	12.21	−.26	.35
Sophomore (n = 44)	57.95	12.00	−.24	.46
Junior (n = 69)	58.65	12.19	−.22	.44
Senior (n = 57)	56.72	10.69	−.11	.46
Graduate Student (n = 17)	63.29	10.92	.15*	.39
Omnibus ANOVA Test	**$F(4, 236) = 1.48, p = .21$**		**$F(4, 237) = 3.78, p = .005 \ \eta_p^2 = .06$**	

* Differs significantly from High School Degree (mean difference = .57, p = .001), Associate's Degree (mean difference = .48, p = .001), and Some College (mean difference = .28, p = .035).
** Differs significantly from Freshman (mean difference=.41, p = .006), Sophomore (mean difference = .39, p = .019, and Junior (mean difference = .37, p = .016).
Note: All post-hoc comparisons conducted using Games-Howell test.

Implicit attitudes. In order to test our hypothesis that implicit theistic attitudes change towards naturalistic attitudes as education and training in psychology increase, we compared participants' IAT difference scores across education level and class standing. Descriptive statistics (see Table 2) show that average difference scores on the IAT do differ by both education level and college class and do so in the predicted direction. When we consider this change in light of the absence of change in explicit attitudes, the results indicate that the implicit attitudes not only change in the predicted direction but also in the opposite direction of participants' explicit attitudes. This opposition suggests that this shift is not merely a product of social desirability or demand characteristics, a finding that increases the validity of both measures, but may reflect an unconscious move toward endorsing a secular stereotype that the participants consciously deny.

Inferential statistics (one-way ANOVA) were conducted with difference scores as the dependent variable and both education level and class standing as independent variables to test whether the pattern of differences in average IAT scores is statistically significant. As Table 2 displays, omnibus tests show a significant difference in the pattern of means of difference scores for both education level and class standing, which supports the hypothesis that increased education and training in psychology changes implicit theistic attitudes toward naturalistic attitudes. Post-hoc analyses indicate that although the pattern of change in difference scores consistently moves away from theism toward naturalism, as predicted across education level and class standing, significant differences between means only emerge at the graduate level. This would suggest that graduate education and training in psychology may have the strongest impact on the shift from implicit theistic beliefs to naturalistic beliefs that appears to mark the educational path of psychologists generally.

Discussion

The results of this study are supportive of our hypothesis and suggest the likelihood that an education in psychology, which includes training in natural science methods, may not be neutral with regard to the faith of students in psychology. On the contrary, it would appear that the more the education and the higher the class level of the respondent, the less likely the person is to implicitly believe that faith is fair. Once students are at the post-graduate level, they are likely to implicitly accept the secular stereotype that faith is biased, which would suggest that they have

developed an implicit prejudice against a vital part of their own faith. We do not have space to consider all the implications of these findings, but we can say that they do offer support for the theoretical case we have made in this special issue (Slife, Reber & Lefevor) and elsewhere (Slife & Reber, 2009a) that naturalism is not neutral with regard to theism, and there are real consequences of an education in naturalistic methods and explanation for the implicit theism of theistic psychology students.

Of course, as with our image of God study example, this study is only an initial foray into this new area of psychological study, and the research results are preliminary. Consequently, additional research and validation of the new instruments developed for use in this study are required. For example, at this point, we have only collected the cross-sectional data that supports our hypothesis that implicit attitudes about theism and naturalism differ by class standing and education level. At this juncture, we have no reason to believe that cohorts across the educational levels are any different on issues related to faith and science biases that would change these results in a longitudinal study. Still, it will be necessary to collect longitudinal data that pairs within-subject analyses of implicit attitude changes with the between-subject results we already have. If the longitudinal data are consistent with the cross-sectional data, our hypothesis will be significantly reinforced.

As with any new program of research, lingering questions requiring further research remain. For example, researchers will need to examine whether this implicit attitude change is unique to psychology or is common across social science disciplines, the natural sciences, arts and humanities, and perhaps even any university education regardless of the students' major. At the same time, it might be important to examine whether increased education and training in particular subdisciplines of psychology have a different effect on implicit theistic and naturalistic attitudes than education and training in other specializations. Also, our study did include five participants with doctoral degrees, which was the group manifesting the highest implicit endorsement of the secular stereotype. It would be interesting and important to further investigate this population to see if there are differences by specialization among doctoral psychologists as well. It would also be important to examine these implicit attitudes and any potential changes in them among populations that are not theistic or religious.

Each of these studies and others that we do not have space to list would provide a clearer understanding of this implicit attitude change phenomenon and would also provide further tests of the reliability and validity of

the new instruments developed. And this is but one possible area of focus in this new program of research. Another area of potential research would be to examine whether the change in implicit theistic attitudes toward naturalistic attitudes and stereotypes is accompanied by changes in behavior. Do theistic psychology students, for example, change the ways they talk about psychological phenomena as their education increases? Will their explanations of happiness or depression, which may have included theistic elements at the beginning of their education, exclude those elements by the time they graduate or enter graduate school? This is but one example of the numerous studies of the behavioral effects of this implicit attitude change that could be conducted.

Conclusion

As we hope to have made clear in our review of these two example studies, theistic programs of research have great heuristic potential, suggesting a whole host of possible hypotheses and research studies as well as prompting the modification and development of new scientific instruments. In our view, this is the epitome of good science: rigorous investigation using a variety of methods and instruments that is theory driven and produces results that inform, reform, and refine theory and increase our understanding of important psychological phenomena. Yet, without considering the possibility that existing method assumptions of psychology might not be neutral with regard to theism, it would likely never occur to conventional psychological researchers to look at these kinds of issues and consider these theistic and faith-related questions.

Given the large number of theists, including theistic psychologists, theistic psychology students, theistic therapy clients, and theistic research participants, it appears to us to be potentially worthwhile and even important to put theistic hypotheses and theories to the test. As we stated in our theoretical paper (Slife, Reber & Lefevor, this issue), we are not requiring the inclusion of theistic programs of research. On the contrary, if theistic programs of research fail to yield results that increase psychologists' understanding of human beings and phenomena, then we should let them fall by the wayside as would any unproductive research program. If however, the selective attention and explanatory focus of the theist adds to, complements, and perhaps even corrects misconceptions about human psychology, as our example studies might do, then we suggest that theistic programs of psychological research be given a chance to compete in the marketplace of scientific investigation.

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