

RELIGIOUS ORIENTATION AND THE AFFECTIVE
MODULATION OF THE STARTLE
RESPONSE

By

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Bachelor of Arts in Psychology

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Stillwater, Oklahoma

2008

Submitted to the Faculty of the
Graduate College of the
Oklahoma State University
in partial fulfillment of
the requirements for
the Degree of
MASTER OF SCIENCE
December, 2012

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MODULATION OF THE STARTLE
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ACKNOWLEDGEMENTS

Cliché as it may seem, first and foremost I would like to thank Jesus Christ, my beautiful Lord and Savior, without whom my life would lack joy, peace, love, and purpose. It is my desire to magnify His name and bring Him glory in all that I do, despite my abundant shortcomings. I would also like to thank my husband, Ben, and my daughter, Kylie, for their flexibility and support through this process. I'm not sure I would have made it without them. I would like to thank my parents, Kirk and Lavonne, for raising me to pursue truth, and my sister, Kristena, for being such a wonderful role model.

This thesis could not have been written without my advisor, Dr. James Grice, whose wisdom and encouragement has been invaluable throughout my academic training. Many thanks to my other committee members as well, Dr. Charles Abramson and Dr. Dale Fuqua, who have helped refine this project through their time invested in reading and providing feedback on my work. I have appreciated greatly their willingness to take the time to discuss topics at length, challenging me to think critically.

I would also like to thank Dr. DeMond Grant for allowing me to borrow his lab space and use his equipment to collect my data, and William Lechner for training me and answering any questions I had. Last, but by no means least, I would like to thank Kathleen Baskin for her willingness to help me collect data.

Name: ERIKA A. BROWN

Date of Degree: DECEMBER, 2012

Title of Study: RELIGIOUS ORIENTATION AND THE AFFECTIVE MODULATION OF THE STARTLE RESPONSE

Major Field: LIFESPAN DEVELOPMENTAL PSYCHOLOGY

Abstract: The current study integrated research on one's religious orientation (Allport, 1966; Allport & Ross, 1967) and the affective modulation of the startle response, specifically motivational priming theory (Lang, Bradley, & Cuthbert, 1990). The primary goal was to differentiate between individuals in four religious orientation groups using their autonomic responses to religious images. A secondary aim was to improve upon current protocol for classifying individuals into religious orientations. Autonomic data were collected first using the Affective Modulation of the Startle Response task, followed by participants' conscious ratings of the images using the Self-Assessment Manikin (Bradley & Lang, 1994). Finally, in counterbalanced order, participants completed a standard measure of religious orientation: the Intrinsic/Extrinsic-Revised Scale (Gorsuch & McPherson, 1989), the Religious Orientation Vignettes (designed to improve upon the current methodology), and a Religious Affiliation and Behaviors questionnaire. Data were analyzed using Observation Oriented Modeling (Grice, 2011). The pattern predicted under motivational priming theory (Lang, Bradley, & Cuthbert, 1990) was not found in the autonomic data. As a result, the four religious orientation groups could only be differentiated using the conscious ratings. The intrinsic group responded most favorably to the religious images, followed closely by the extrinsic and indiscriminate groups. The nonreligious group responded least favorably. A pattern analysis revealed a 71% overlap between the standard method of using median splits (Hood, 1970) on the Intrinsic/Extrinsic-Revised Scale (Gorsuch & McPherson, 1989) and the Religious Orientation Vignettes in the classification of individuals into religious orientation groups. It is suggested that the Religious Orientation Vignettes provide a more straightforward, theoretically sound method of classification than the Intrinsic/Extrinsic-Revised Scale for all four religious orientations, especially the nonreligious group.

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CHAPTER I

INTRODUCTION

One's religiosity has been shown to affect nearly all aspects of an individual's life – from psychological well-being (Laurencelle, Abell, & Schwartz, 2002) to interpersonal functioning (Mahoney, Pargament, Tarakeshwar, & Swank, 2008). These effects of faith and religion on the individual have increasingly become the focus of empirical studies over the past several decades (Emmons & Paloutzian, 2003). Results indicate the importance of considering not only *if* an individual is religious, but *how* he or she is religious (Allport, 1966; Allport & Ross, 1967). Assessing the divergent religious orientations of individuals provides an explanation for how their religious motivations affect their lives differentially.

The area of reflex modification has likewise enjoyed an increase in the number of empirical studies being conducted within the last several decades. Although its effects were first documented in the 19th century by Ivan Sechenov (Ison & Hoffman, 1983), the ability of an affectively charged stimulus to modulate an individual's startle response has been formalized more recently using the motivational priming theory (Lang, Bradley, & Cuthbert, 1990). According to this theory, in the presence of an aversive stimulus, the defensive nature of the startle response is heightened. If the stimulus is appetitive, however, the defensive startle response is diminished.

An integration of these two burgeoning areas of research would ideally serve to provide further evidence that religious individuals possess differing motivations for their beliefs and

behaviors as well as to provide a deeper understanding of an individual's emotional experience of his or her religion. The current study aimed to gain a richer understanding of how one's religious motivations affect his or her response to visual religious stimuli. The principal goal was to investigate how individuals with varying religious orientations respond differentially to religious images, thereby discerning whether their emotional response is positive or negative. A secondary aim of the current study was to improve upon the current methodology used to classify individuals into various religious orientations.

CHAPTER II

REVIEW OF LITERATURE

Religious Orientation

The past several decades have witnessed an upsurge in the number of empirical studies investigating the effects that faith and religion have on an individual (Emmons & Paloutzian, 2003). The results of many of these studies have suggested a positive relationship between religiosity and psychological well-being (Laurencelle, Abell, & Schwartz, 2002), interpersonal functioning (Mahoney, Pargament, Tarakeshwar, & Swank, 2008), and physical and mental health (Koenig, McCullough, & Larson, 2001). Others, however, have reported inconsistent findings (Bloom, 2012; Leonardi & Gialamas, 2009; Lewis, Ritchie, & Bates, 2011); and some researchers (Allport & Kramer, 1946; Ellis, 1980) have suggested that religiosity has a negative impact on individuals, such that “religiosity is in many respects equivalent to irrational thinking and emotional disturbance” and that the “solution to emotional problems is to be quite unreligious” (Ellis, 1980, p. 637). On the whole, reviews of the research point to inconsistent findings with small effect sizes (Bergin, 1983; Bergin, 1991; Gorsuch, 1988).

In an effort to better understand the link between religiosity and individual characteristics, Allport (1966; Allport & Ross, 1967) discussed the importance of considering not only whether an individual is religious, but also how he or she is religious. Individuals with divergent religious motivations may experience various psychological outcomes differentially. Allport therefore proposed two religious orientations – *intrinsic* and *extrinsic* – that emphasized

the importance of the subjective religious experience and motivations of the individual. An individual who is intrinsically motivated is described as one who *lives* his or her religion as an end in and of itself, whereas an individual who is extrinsically motivated is described as one who *uses* his or her religion as a means of reaching some other goal. The individual with an intrinsic religious orientation has internalized his or her religious beliefs and lives a more devout religious life. On the other hand, an individual with an extrinsic religious orientation participates in religious activities and behaviors with a utilitarian intent of achieving some form of personal, social, or economic gain. In short, the intrinsic religious orientation serves as an “indicant of religious commitment,” whereas the extrinsic religious orientation refers to the “sort of religion that gives religion a bad name: prejudiced, dogmatic, fearful” (Donahue, 1985, p. 422).

Employing the concept of religious orientation as a bipolar continuum upon which individuals who profess some religious affiliation would fall, Allport and Ross (1967) developed the Religious Orientation Scale (ROS) to investigate the paradoxical link between religion and increased prejudice (Allport & Kramer, 1946; Rosenblith, 1949) and intolerance (Stouffer, 1955). They found that, on average, those individuals who had a more extrinsic religious orientation (and used their religion as a means toward their own goals) did indeed exercise more prejudice and intolerance than nonreligious individuals. Such was not the case, however, for those individuals who were more intrinsically motivated (and lived their religion as an end in and of itself). In light of these findings, the need to distinguish between the types of religious orientation individuals adhere to is apparent. Since extrinsically motivated individuals may score high on a particular scale, while intrinsically motivated individuals may score low (or vice versa), not measuring religious orientation and averaging across individuals could yield misleading results with nullified or small effects that fail to capture what is truly happening with the individuals.

Types of Religious Orientation

Although originally theorized to anchor the endpoints of a single continuum upon which individuals who profess some religious affiliation would fall, Allport and Ross (1967) noted that “pure” cases of the intrinsic and extrinsic religious orientations were not always found. Not all individuals were consistent in endorsing the items of only one side of the continuum.

Interestingly, Allport failed to mention Feagin’s (1964) work which had previously suggested that Allport’s intrinsic and extrinsic religious orientations constituted two major, orthogonal factors as opposed to a unidimensional structure. Nonetheless, to address this “religious muddleheadedness,” Allport and Ross’ original (one-dimensional) scoring method (where high scores indicate an extrinsic orientation and low scores indicate an intrinsic orientation) was expanded, producing a fourfold typology of religious orientation. This (two-dimensional) scoring method classified individuals as *intrinsic*s (those who score high on intrinsic motivation and low on extrinsic motivation), *extrinsic*s (those who score low on intrinsic motivation and high on extrinsic motivation), *indiscriminate*s (those who score high on both intrinsic and extrinsic motivation), or *nonreligious* (those who score low on both intrinsic and extrinsic motivation).

Using this reformulation, Allport and Ross (1967) found that indiscriminate individuals, on average, were more prejudiced than extrinsic individuals (who were more prejudiced than intrinsic individuals) when averaging across all religious affiliations. The same was not always the case, however, within the individual religious affiliations. While Allport and Ross noted that the nonreligious group does exist, it was excluded from their work because “such cases are not found” among their samples of churchgoers (p. 438). Later, Hood (1970) suggested the use of median splits when classifying individuals into the four groups, thereby reintroducing the nonreligious group into the typology.

Later Developments in Understanding Religious Orientation

Kirkpatrick (1989) reanalyzed 12 studies that used Allport and Ross' (1967) Religious Orientation Scale using Principal Axis factor analysis and Equimax rotation. He also noted that psychometric flaws existed in the bipolar continuum (i.e., single factor solution) originally theorized by Allport and Ross. This was evidenced in that people commonly endorsed both intrinsic and extrinsic items. However, he found a two-factor solution to also be an insufficient structure. Instead, he showed that a three-dimensional structure was supported that included an intrinsic factor and two extrinsic factors – *personally extrinsic* and *socially extrinsic*. Personally extrinsic items describe individuals who use their religion for comfort and protection, whereas socially extrinsic items describe individuals who use their religion for social or economic gain.

Gorsuch and McPherson (1989) incorporated the structural recommendations of Kirkpatrick (1989) as well as the wording from Gorsuch and Venable's (1983) Age-Universal I-E Scale (which modified the wording of the original ROS to make the measure more generalizable for use with individuals of all educational backgrounds). The outcome of their factor analysis also supported the presence of a three-factor solution. The resulting instrument, the Intrinsic/Extrinsic-Revised Scale (I/E-R, see Appendix A), was thus designed to be understood by a broader array of individuals and to measure intrinsic religious orientation as well as both categories of extrinsic religious orientation.

Subsequently, Tiliopoulos, Bikker, Coxon, and Hawkin (2007) analyzed the correlation matrix of the I/E-R using Principal Axis factor analysis and also found support for the same three-factor solution.¹ Using a Principal components analysis with an Oblimin rotation, support for a three-dimensional structure was also found by Maltby (1999) using 12 items from the I/E-R and 3 additional items.

¹ Support for a two-dimensional structure was also found, supporting Pargament's (1997) theory of religious orientations. Further discussion of this is, however, beyond the scope of this paper. The interested reader is referred to the original work for more information.

Limitations in the Research

Feagin (1964) warned that the intrinsic subscale was not as valuable as the extrinsic subscale in differentiating individuals. He posited that this was the result of a possible “halo response,” whereby respondents felt pressure to present themselves as more devout than they may have been in reality. The extrinsic scale was better able to differentiate individuals (i.e., more variance was observed along the extrinsic scale than the intrinsic scale). He went on to discuss, however, that this may have been an issue specific to his sample, having sampled solely from Southern Baptists. Given that this issue was not discussed by other researchers in their later works, it may indeed have been a product of sampling bias. It remains worth considering, though, whether the groups will emerge as neatly in reality as they are theorized.

Another concern that is common in research aimed at measuring religiosity is that oftentimes only religious individuals of a particular faith (e.g., Christians) are included in the sample. This clearly restricts the observed range, attenuating the correlations. For example, the normed means and standard deviations for the intrinsic ($M = 37.2$, $SD = 5.8$, range 8-40) and combined extrinsic ($M = 25.6$, $SD = 5.7$, range 6-30) factors on the Intrinsic/Extrinsic-Revised Scale were both high and did not represent the entire range of the scale very well (Gorsuch & McPherson, 1989). Conversely, including individuals with other religious affiliations or nonreligious individuals could produce meaningless results because of a change in the content domain and overall factor structure. In other words, “in order to understand different ways of being religious, it is necessary to study people who are at least religious in the first place” (Kirkpatrick, 1989, p. 6). Still, some researchers have begun including individuals of a variety of religious affiliations (and non-affiliations) in their samples (e.g., Genia, 1993; Maltby, 1999; Maltby & Lewis, 1996). Investigations such as these should aid in a better understanding of the utility of classifying the religious orientations of religious and nonreligious individuals alike. To reiterate, though, it is possible that individuals do not fall neatly into the theorized groups.

Finally, although a simple factor structure for the I/E-R was attained by the data reported by Tiliopoulos et al. (2007) and Maltby (1999), a need to address the low reliability estimates of the two extrinsic factors exists. One (traditional) way to do this would be to determine which items could be added to increase reliability in the measurement, especially since both extrinsic factors are currently only comprised of three items each. However, small (or even single) item questionnaires can be beneficial at times (Gorsuch & McPherson, 1989) and often yield results comparable to those obtained from multiple items. Innovative techniques are readily available to researchers interested using a single item and have been shown to be as effective as multiple items with the added benefit of brevity (Barrett & Paltiel, 1996; Brown & Grice, 2011; Grice, Mignogna, & Badzinsky, 2011). In fact, the utility of a single item has been demonstrated as a viable and successful alternative to requiring multiple items in a variety of contexts, such as personality (Woods & Hampson, 2005), attitudes toward advertisements (Bergkvist & Rossiter, 2007), and job satisfaction (Nagy, 2002) to name a few.

Affective Modulation of the Startle Response (AMSR)

Research investigating reflex modification was conducted as early as 1862 by Ivan Sechenov (Ison & Hoffman, 1983). The Russian scientist documented the effects of various events on the latency of the reflexes in both animals as well as humans (namely, himself). He demonstrated, in one experiment, that his reflex of removing his hand from a mild acid was delayed while he was being tickled by an assistant. Since that time, research on the startle response – the autonomic reflex to an abrupt, intense stimulus – has seen both ebbs and flows, but has recently enjoyed a resurgence in such areas as smoking cues (Dempsey, Cohen, Hobson, & Randall, 2007), rejection and self-esteem (Gyurak & Ayduk, 2007), and race bias (Amodio, Harmon-Jones, & Devine, 2003).

The presence of an affectively charged stimulus (either appetitive or aversive) is capable of modulating the startle response experienced by an individual. According to their motivational priming theory, Lang, Bradley, & Cuthbert (1990) surmise that the startle reflex, being defensive in nature, is activated when presented with an aversive stimulus that elicits a negative emotion but is inhibited when presented with an appetitive stimulus that elicits a positive emotion, provided that the arousal level of the stimuli is capable of eliciting a reaction. For example, the presence of a highly arousing noxious stimulus, such as looking down the barrel of a gun on a gloomy night in a dark alley, will heighten the defensive startle reaction. On the other hand, the presence of a highly arousing pleasant stimulus, such as spending time with a loved one at a romantic destination on a beautiful day, will inhibit the defensive startle reaction. Put another way, if the stimulus (i.e., the circumstance) is aversive in nature, the individual is likely to already be “on edge” and is expected to startle easier. If the stimulus is appetitive in nature, the individual is likely more distracted and is expected to have an inhibited startle reaction. Hollywood employs similar assumptions in trying to elicit certain reactions from audience members by setting the stage with specific lighting and sound effects.

Although the modification of the startle reflex makes it possible to discern the emotional valence (positive or negative) an individual has in response to a particular stimulus, Lang, Bradley, and Cuthbert (1990) note that it is not possible to ascertain the specific emotion felt by the individual. Moreover, the modulation of the startle response is most effective when the stimuli are highly arousing, as in the case of images depicting life threatening or erotic situations (for negative and positive valences, respectively), and the startle response is elicited between 0.5 and 5 seconds after the stimulus is presented (Bradley & Lang, 2007).

Measuring the Startle Response

The sudden input of sensory data results in the physiological response of rapid movements throughout the body, or the startle response (Landis & Hunt, 1939). Although

commonly used physiological techniques such as cardiovascular and electrodermal activity can be employed to measure the autonomic startle response noninvasively and with little difficulty, their shortcoming lies primarily in the fact that they do not differentiate between the attitudinal valence of the response (Ito & Cacioppo, 2007). The autonomic response resulting from both an appetitive and aversive stimulus of equal intensity will appear identical on these measures (i.e., a pleasant stimulus will result in an increase in heart rate just as a similarly arousing noxious stimulus will).

The method of choice for measuring the physiological response of the startle reflex involves the use of electromyography (EMG) in measuring eyeblinks (Berg & Balaban, 1999). EMG measures the electrical impulses from muscle contractions. This can be obtained from the muscle directly, using an inserted needle electrode. However, the effects of the contracting muscle can also be measured on the skin's surface using less invasive surface electrodes (sans needles). Therefore, using EMG to measure eyeblinks involves measuring the electrical impulses of the musculature contractions around the eye, more specifically, the orbicularis oculi (Berg & Balaban, 1999). The startle response should result in a larger contraction of the orbicularis oculi when presented with a negative stimulus and a smaller contraction in the presence of a positive stimulus compared to the baseline level for an individual (i.e., without adding either a positive or negative stimulus to modify the startle response).

Eliciting the Startle Response

The nature of the sensory data used to elicit the startle response is most commonly visual, cutaneous, or auditory. The use of visual probes (e.g., a bright flash of light) has been shown to produce the weakest eyeblink results compared to the use of both cutaneous and acoustic probes (Zeigler, Graham, & Hackley, 2001). Cutaneous probes (e.g., electrical stimulation, puffs of air) also have their share of drawbacks. Most notably, the use of any level of electrical stimulation is considered too invasive for many institutional review boards (Dworkin, 2000), and using a puff of

air is typically confounded by the noise that accompanies the air being released (Haerich, 1994). Therefore, auditory probes are the most commonly used method for eliciting the startle response.

When using an auditory probe, the bandwidth, intensity, risetime, and duration must all be taken into account as influential factors of the startle response. In terms of bandwidth, multi-tonal white noise has been shown to be more effective at eliciting the startle response than a singular tone (Wynn, Dawson, & Schell, 2000). As the intensity of the probe increases from 60 dB to 100 dB, the startle response becomes more evident (Turpin, Schaefer, & Boucsein, 1999). The risetime, or the amount of time required for the probe to reach its peak intensity, is best to be as short as possible. Turpin, Schaefer, and Boucsein (1999) found that a probe with a risetime of 5 milliseconds elicited a stronger startle response than a probe with a 200 millisecond risetime. Lastly, the duration of the probe is typically between 10-50 milliseconds in human studies (Berg & Balaban, 1999).

Limitations in the Research

Although the emotional valence (positive or negative) of an individual's response to a particular stimulus can be ascertained according to motivational priming theory (Lang, Bradley, & Cuthbert, 1990), the specific emotion felt by the individual cannot. As a result, much of the emotional response remains unexplained (e.g., the reason for why the emotional response was positive or negative). Furthermore, it is possible that a particular stimulus would not elicit the expected response in all people or in the same person all of the time. For example, the aversive stimulus of a snake may not elicit a negative response in an individual who has frequently owned snakes as pets, or the appetitive stimulus of a romantic sunset along the beach may no longer elicit a positive response in an individual after he or she experiences a dramatic breakup with a romantic partner. In short, the idiosyncratic experiences of the individual are likely to play a vital

role in determining if the stimulus is experienced as positive or negative by an individual, regardless of what the aggregate response is.

An additional concern with motivational priming theory is that it presumes the startle response to be defensive in nature. The startle response could, however, represent an inquisitive response similar to the orienting response first theorized by Eugene Sokolov (Sokolov, Spinks, Näätänen, & Lyytinen, 2002). Additionally, if the startle probe is presented over several trials, the startle response – whether defensive, inquisitive, or otherwise – may diminish as a result of habituation, interfering with the ability to determine the valence of the response.

The Current Study

The current study aimed to integrate the two fields of research discussed above – religious orientation and the affective modulation of the startle response. The primary goal of the study was to investigate how individuals of a particular religious orientation differ in their emotional response to a religious image at an autonomic level. The secondary goal was to examine the viability of assessing religious orientation using single item vignettes for each major type of orientation (intrinsic and extrinsic).

Hypotheses

Allport and Ross' (1967) fourfold typology of religious orientation (intrinsic, extrinsic, indiscriminate, and nonreligious) was used to classify individuals. Two vignettes were created to assess intrinsic and extrinsic orientations, respectively, with a single item. Individuals were then placed into one of the four groups (intrinsic, extrinsic, indiscriminate, or nonreligious) based on their agreement or disagreement with each of the two vignettes. Using an acoustic startle probe (white noise) and electromyography (EMG) to measure the musculature contractions of the orbicularis oculi (eyeblinks), the affective modulation of the startle response in the presence of religious images was recorded. It was hypothesized that individuals with an intrinsic religious

orientation would respond most favorably to the religious images. This was expected based on Allport's (1966; Allport & Ross, 1967) definition of intrinsics as individuals who have internalized their religion and live a more devout life. In other words, these individuals have adopted their religion as part of their own identity and should respond positively to images that reflect their beliefs. The extrinsics and indiscriminates were expected to show some positive affect toward the images, but not as positive as the intrinsics. If differences between extrinsics and indiscriminates were found, it was expected that the extrinsics would have a more positive affective response. This was based largely on the findings that "religious muddleheadedness" (i.e., an indiscriminate orientation) coincided with higher average levels of prejudice compared to individuals with an extrinsic orientation. However, this conjecture was, admittedly, rather speculative. Lastly, nonreligious individuals were expected to have an emotional reaction that was, relatively speaking, less positive or more negative in valence. In short, this was expected because they have not incorporated these religious beliefs into their daily life either intrinsically or extrinsically. Hence, they should have a less positive reaction to the images compared to those who have a different religious orientation. That is not to say, however, that they were expected to have a decidedly negative emotional reaction – only that they would have the least positive reaction compared to the other groups.

To address the secondary goal, the two vignettes described above were again used to classify individuals into one of the four groups (intrinsic, extrinsic, indiscriminate, or nonreligious) based on their agreement or disagreement with each. These group assignments were then compared to those obtained from the commonly employed method of using median splits (Hood, 1970) of individuals' Intrinsic and (overall) Extrinsic Religiosity scores as measured by the Intrinsic/Extrinsic-Revised Scale (Gorsuch & McPherson, 1989). Given the large amount of success that single item questionnaires have had in producing results comparable to those obtained from multiple items in a wide variety of research contexts (Bergkvist & Rossiter, 2007;

Gorsuch & McPherson, 1989; Grice, Mignogna, & Badzinsky, 2011; Leonardi & Gialamas, 2009; Nagy, 2002; Woods & Hampson, 2005), it was hypothesized that the vignettes would be just as effective as the standard scoring methodology at classifying individuals into each of the religious orientations.

CHAPTER III

METHODOLOGY

Participants

A convenience sample was recruited through the Sona Research Participation System. Participants were invited to participate in the study based on their response to three marker items taken from the I/E-R designed to provide a quick assessment of one's religious orientation. Participants consisted of both individuals who considered themselves religious and those who did not. Of those who called themselves religious, only those who identified themselves as Christian were recruited due to the Christian emphasis in the current study's measures.

Using the two religious orientation vignettes (discussed in detail below) to classify individuals into groups, 9 participants (6 female, 3 male) identified themselves as intrinsic, 10 (8 female, 2 male) identified themselves as extrinsic, 6 (4 female, 2 male) as indiscriminate, 9 (5 female, 4 male) as nonreligious, and 1 felt she could not be correctly classified, resulting in a total of 35 participants. Overall, twenty-four were female (68.57%) and 11 (31.43%) were male. One participant was Asian (2.86%), 28 were Caucasian (80%), 1 was Hispanic (2.86%), 3 were Native American (8.57%), 1 was Caucasian/Middle Eastern (2.86%), and 1 was Caucasian/Native American (2.86%). Ages ranged from 18 to 23 years ($M = 19.09$, $SD = 1.22$).

Materials

Basic Medical Questions. Participants were asked basic medical questions, including if they have

any visual or hearing impairments, if they have had any surgeries, if they take any medications or vitamins, or if they have consumed any nicotine, drugs, alcohol, or caffeine in the previous 12 hours. These questions were intended to be used ad hoc if any unusual results were found in their AMSR data.

Affective Modulation of the Startle Response (AMSR). The materials and equipment used to measure the affective modulation of the startle response include a Radioshack Digital Sound Level Meter (model 33-2055), rubbing alcohol wipes, Nuprep skin preparing gel (Weaver & Company, Aurora, CO), surface electrodes (Ag-AgCl 4 mm, In Vivo Metric, E220-LS), Signa Gel electrode gel (Parker Laboratories, Fairfield, NJ), an impedance-meter (UFI Celectrode, model 1089mkIII, Morro Bay, CA), binaural headphones (Sennheiser, model HD 202), a BioPac V75-05 Bioamplifier, a BioPac V76-23 contour-following integrator, and the BioPac Instruments Human Startle Software.

Standardized affective images were selected from the International Affective Picture System (IAPS, Center for the Study of Emotion and Attention, 1995). The startle response is modulated most effectively when highly arousing stimuli are used, as in the case of erotic images or images of life threatening situations (Bradley & Lang, 2007). However, given that the subject matter of the current study is focused on religion, erotic images were not used due to the possibility that many of the participants would find them too offensive in nature and choose not to participate. Ten positive images depicting mainly animals and nature (IAPS ID: 1620, 1710, 1750, 2070, 5830, 5833, 8190, 8470, 8499, 8501), ten negative images portraying primarily life threatening situations such as animals attacking (IAPS ID: 1050, 1120, 1300, 1321, 1525, 1931, 6230, 6244, 6250, 6300), and ten neutral images of mainly household items (IAPS ID: 7010, 7030, 7041, 7050, 7052, 7055, 7056, 7175, 7217, 7705) were selected. These images serve as the basis for comparison of the participants' emotional reaction to ten religious images – the images of interest in the current study (see Appendix B).

Self-Assessment Manikin (SAM). The Self-Assessment Manikin (Bradley & Lang, 1994) provides a conscious affective rating of the images. Using a 9-point Likert-type scale, participants rate each image they viewed for both valence (ranging from “unpleasant” to “pleasant”) and arousal (ranging from “dull” to “extremely arousing”). Thus, each picture viewed receives two scores indicating two aspects of the participants’ conscious affective response. Also included was a question asking participants what comes to mind when they look at each image. Participants were asked to respond to this open-ended question via free response, providing a statement or two of whatever their reaction to the image was.

Intrinsic/Extrinsic-Revised Scale (I/E-R). The Intrinsic/Extrinsic-Revised Scale (Gorsuch & McPherson, 1989, see Appendix A) consists of 14 items regarding one’s religious beliefs and practices. The items were randomized and administered using Idiogrid Version 2.4 (Grice, 2002). Participants indicate the extent to which they agree with each item using a 5-point Likert scale (ranging from “strongly disagree” to “strongly agree”). Intrinsic Religiosity and Extrinsic Religiosity scores are computed, ranging from 8 to 40 and 6 to 30, respectively. Scores for the subcategories of Extrinsic Religiosity are also computed, ranging from 3 to 15 for both personally extrinsic and socially extrinsic. For the current study, average scores were computed for Intrinsic Religiosity and (overall) Extrinsic Religiosity as a means of dealing with missing data. Furthermore, to address the secondary hypothesis, median splits of individuals’ average Intrinsic Religiosity and (overall) Extrinsic Religiosity scores were used to categorize individuals as intrinsics, extrinsics, indiscriminates, or nonreligious (Hood, 1970).

Since the wording from the Age-Universal I-E Scale was used, the I/E-R is designed to be appropriate for use with an educational background of fifth grade or higher (Gorsuch & Venable, 1983). Reliability estimates of the original ROS and the normed estimates of the I/E-R were obtained from a sample of 771 college students attending both secular and religious universities (Gorsuch & McPherson, 1989). The authors also reported the reliability estimates for

the I/E-R Scale using a comparison sample of 467 fifth through eleventh grade students.

Reliability estimates of the Intrinsic factor were sufficiently high and comparable across the traditional and revised scales and across samples (see Table). However, the reliability coefficients for the combined extrinsic factor were moderate. Further, the reliability estimates of the two separate extrinsic factors were fairly low. As Gorsuch and McPherson discuss, this could be a result of the small number of items that compose each of the extrinsic factors (3 items for each), neither of which will be analyzed in this study. Higher estimates were obtained, however, for all factors by Tiliopoulos, et al. (2007).

Table

Reliability Estimates of the ROS and the I/E-R

| Scale | Factor | r_{xx} |
|-------|----------------------|-----------|
| ROS | Intrinsic | .82 |
| | Extrinsic | .66 |
| I/E-R | Intrinsic | .83 (.76) |
| | Extrinsic – Combined | .65 (.66) |
| | Extrinsic – Personal | .57 (.53) |
| | Extrinsic – Social | .58 (.73) |

Note. Table reported in Gorsuch and McPherson (1989).

Values in parentheses are from the comparison sample.

Discriminant validity of the factors is reported as .07 for intrinsic versus personally extrinsic; -.12 for intrinsic versus socially extrinsic; and .41 for personally extrinsic versus socially extrinsic (Gorsuch & McPherson, 1989). According to Tiliopoulos et al. (2007), the factors were assessed as being even more independent (the highest estimate was .17 for the two extrinsic factors). Tiliopoulos and colleagues also measured prayer and church attendance as a means of assessing construct validity. As would be expected from Allport and Ross (1967), they found that all three orientations were positively correlated with these religious behaviors, but the strongest correlations were with the intrinsic orientation. No significant correlations were found between any of the orientations and age or number of years having been a Christian.

Religious Orientation Vignettes. The use of a single item has been successfully demonstrated as a viable alternative to multiple items in measuring a variety of constructs, such as job satisfaction (Nagy, 2002), attitudes toward advertisements (Bergkvist & Rossiter, 2007), the Big Five personality traits (Grice, Mignogna, & Badzinsky, 2011; Woods & Hampson, 2005), and religiosity (Leonardi & Gialamas, 2009), to name a few. Likewise, single-item vignettes of Intrinsic Religiosity and Extrinsic Religiosity (see Appendix C) were presented to the participants in counterbalanced order. Participants indicated whether the vignettes primarily described his or her religious orientation by answering “yes” or “no” to each. A “does not apply” option (scored the same as answering “no”) was also included for individuals who may not feel comfortable answering questions that imply they have a religious orientation (i.e., nonreligious individuals). Participants’ responses to the vignettes were used to categorize them as intrinsics, extrinsics, indiscriminates, or nonreligious. Participants were told which religious orientation they were assigned to and were asked to provide an example of why this was (or was not) an accurate description of what they intended to convey with their responses.

Descriptions are provided only for the two classifications of one’s religious orientation originally expounded by Allport and Ross (1967) – Intrinsic Religiosity and Extrinsic Religiosity.

The two subcategories of extrinsic religiosity (i.e., personally extrinsic and socially extrinsic) were not expounded primarily due to the theoretical difficulty of separating them in a consistent and mutually exclusive manner. Given that 1) these subdivisions were developed largely as a consequence of exploratory factor analysis as opposed to a theoretical explanation, 2) the reliability estimates of the two extrinsic factors separately were quite low, and that 3) the discriminant validity of the two extrinsic factors was relatively high, they were combined to create a more conceptually and statistically coherent concept.

Religious Behaviors and Affiliation. Along with their religious affiliation, participants were asked to report the number of religious activities other than religious services they have been involved in over the past year, as well as the number of religious services they attend, the number of hours they spend in prayer, and the number of hours they spend reading the Bible in a typical week (see Appendix D).

Procedure

Participants first completed the basic medical questions. Next, the participants completed the Affective Modulation of the Startle Response task. To prepare, the researcher ensured that the acoustic startle probe (white noise) would be administered to the participant at approximately 105 dB – high enough to elicit the startle response and yet below the recommended safety guidelines for research (Greene, Turetsky, & Kohler, 2000). The researcher then cleaned and abraded the skin above the orbicularis oculi using rubbing alcohol wipes and Nuprep skin preparing gel. The surface electrodes were prepped with Signa Gel electrode gel and placed on the orbicularis oculi (see Figure 1). An impedance-meter was used to ensure that the electrodes did not have a signal higher than 5 kiloOhms. Practice eyeblinks also ensured the electrodes were hooked up correctly and were emitting the appropriate readings.

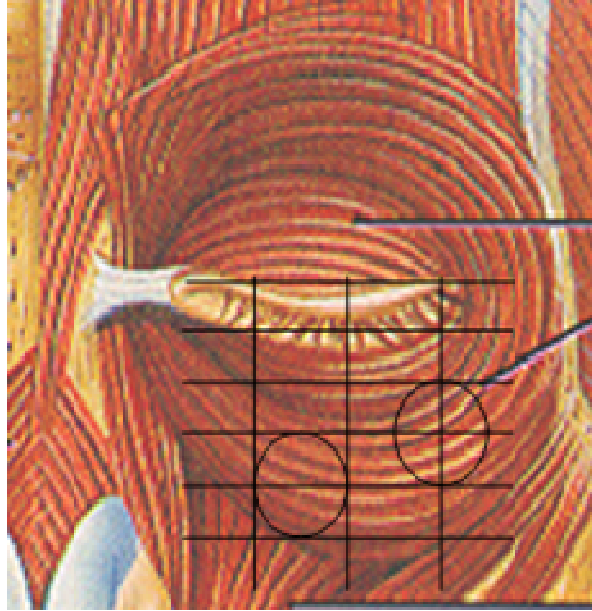


Figure 1. Placement of surface electrodes for AMSR task.

Once the participant was prepared for the AMSR task, a habituation phase of ten startle probes paired with a blank screen commenced followed by one of five automated presentations of the 40 images (positive, negative, neutral, religious) in semi-random order. To reduce expectancy effects, the startle probe was administered 3.5 to 4.5 seconds after the presentation of an image with near instantaneous (<1 millisecond) risetime for 80% to 87.5% of the images (depending on which automated presentation was being used).

Participants were then asked to complete the Self-Assessment Manikin, followed by the Intrinsic/Extrinsic-Revised Scale, the Religious Orientation Vignettes, and the Religious Behaviors and Affiliation in counterbalanced order. Lastly, participants were told what religious orientation they were assigned to using their responses from the Religious Orientation Vignettes. They were asked if the assigned classification is the one they intended to convey with their responses and to provide an example of why or why not.

CHAPTER IV

FINDINGS

Primary Hypothesis

Autonomic Data

Electromyography (EMG) data from the AMSR task were amplified 50,000 times using a BioPac V75-05 Bioamplifier and full-wave rectified using a BioPac V76-23 contour-following integrator with a bandpass filter of 8-150 Hz and a 10 millisecond time constant. The BioPac Instruments Human Startle Software was then used to score these integrated signals. The difference between the participant's baseline (the value immediately before the onset of the startle probe) and peak response (within 50 to 250 milliseconds following the startle probe) was used to calculate the startle response.

It was hypothesized that an individual's religious orientation would be discernible from his or her emotional reaction to the religious images. However, before the individual's response to the religious images could be established, it was first necessary to determine if the predicted pattern of responses was found for the standardized images. That is, were participants responding positively (i.e., with a diminished startle) to the positive images and negatively (i.e., with an increased startle) to the negative images? Toward this end, data were analyzed using Observation Oriented Modeling (OOM; Grice, 2011). Each individual's startle responses for the positive, neutral, and negative images were ordered into three approximately equal units of observation,

with a difference no greater than two responses between the units. The analysis then involved building and testing the model for each individual using Type of Image (i.e., the first ordering) as the cause and Startle Response (i.e., the second ordering) as the effect. Thus, the Startle Response was conformed to the Type of Image using the OOM rotation algorithm. The expectation was that, for *each individual*, the smallest startle responses would have been in response to the positive images, the middle startle responses would have been in response to the neutral images, and the largest startle responses would have been in response to the negative images.

Across the 35 participants, the predicted pattern was only found for 4 participants (11.43%), an example of which can be seen in Figure 2. Although the predicted pattern was found for this participant, the results remain somewhat unimpressive. Only 12 of the 25 startle responses were correctly classified (48%). Moreover, a randomization test using 1000 trials revealed that at least 48% of the startle responses were correctly classified by chance 58% of the times ($c = .58$). For the remaining three participants who also revealed the predicted pattern, 40.74%, 42.31%, and 51.85% of the startle responses were correctly classified. A randomization test resulted in equal or higher percent correct classifications on 77%, 85%, and 28% of the 1000 trials, respectively. In other words, for these four individuals, the observed results were not improbable. The percent of correctly classified startle responses was frequently met or exceeded in randomizations of the data (i.e., by chance).

The pattern opposite to what was predicted (i.e., lowest startle responses in response to the negative images, middle startle responses in response to the neutral images, and largest startle responses in response to the positive images) was found for 6 participants (17.14%), an example of which is depicted in Figure 3. Percent correct classifications ranged from 38.46% to 51.85%, and the corresponding c -values ranged from .88 and .27, respectively. A total of 17 other (non-predicted) patterns were found for the remaining 25 participants (71.43%). Percent correct

classifications ranged from 15.38% to 60.00%, and the *c*-values ranged in value from 1 to .06, respectively.

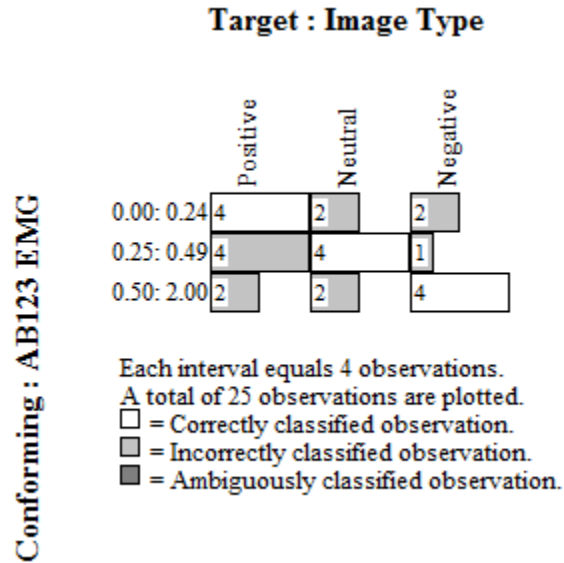


Figure 2. Participant's pattern of results for standardized images, matches expectation.

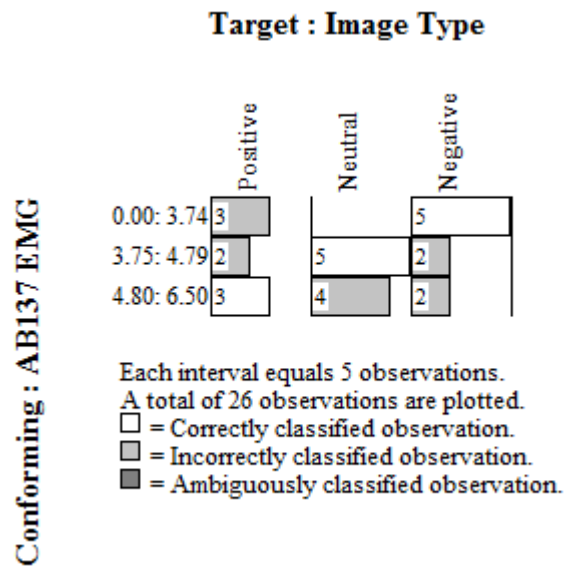


Figure 3. Participant's pattern of results for standardized images, opposite of expectation.

Since the predicted pattern of startle responses for the standardized images was not found for the vast majority of the participants, it would not make sense to compare the startle responses for the religious images to the observed pattern. Since the startle responses for the standardized images cannot be used as a reliable benchmark for what an individual's positive, neutral, and negative response looks like, it is also not possible to establish an individual's emotional valence in response to the religious images at an autonomic level (or, consequently, to explore whether individuals with varying religious orientations respond differentially to religious images).

Conscious Ratings

Despite not being able to investigate the emotional reaction to the religious images on an autonomic level, the participants did provide a conscious rating of how pleasant they found each image using the Self-Assessment Manikin (SAM). These conscious ratings were analyzed using Observation Oriented Modeling (Grice, 2011) in an attempt to discern if individuals with different religious motivations responded to the religious images as was predicted in the primary hypothesis (i.e., that intrinsic individuals would respond most favorably, followed by extrinsic, indiscriminate, and nonreligious individuals, respectively).

The Religious Orientation Vignettes were used to classify individuals into Religious Orientation units. Averages were then computed of how pleasant each participant rated the religious images (called Religious Pleasant). One participant did not feel that she could be correctly classified into one of the four religious orientations, and one participant did not follow directions in completing the SAM. Therefore, these two participants were not included in this analysis, leaving a total of 33 participants. Since there are four units for Religious Orientation, four approximately equal units of observation were created for Religious Pleasant (i.e., 1.0: 3.0, 3.1: 5.0, 5.1:7.0, and 7.1:9.0). Finally, Religious Pleasant was conformed to Religious Orientations using the OOM rotation algorithm in an attempt to discriminate between the groups.

As the multigram in Figure 4 shows, a somewhat clear pattern emerged. The groups were able to be differentiated fairly well with 17 of the 33 participants (51.52%) correctly classified. The randomization results revealed that this percent correct classification (PCC) was met or exceeded only 19 of the 1000 trials ($c = .02$), indicating that these results were highly improbable. Consistent with what was expected, the intrinsic individuals tended to rate the pleasantness of the religious images the highest. Also consistent with the hypothesis, the nonreligious individuals tended to rate the pleasantness of the religious images the lowest compared to the other religious orientations. The pattern is less clear for the extrinsic and indiscriminate individuals. Most of the extrinsic individuals also rated the images as highly pleasant (consistent with the intrinsic individuals, contrary to what was predicted), and the indiscriminate individuals tended to rate the images as more pleasant than did the nonreligious individuals but less pleasant than did the intrinsic individuals (consistent with the hypothesis). Interestingly, only one individual – an extrinsic individual – rated the images on the lowest level of pleasantness. This will be discussed in more detail below.

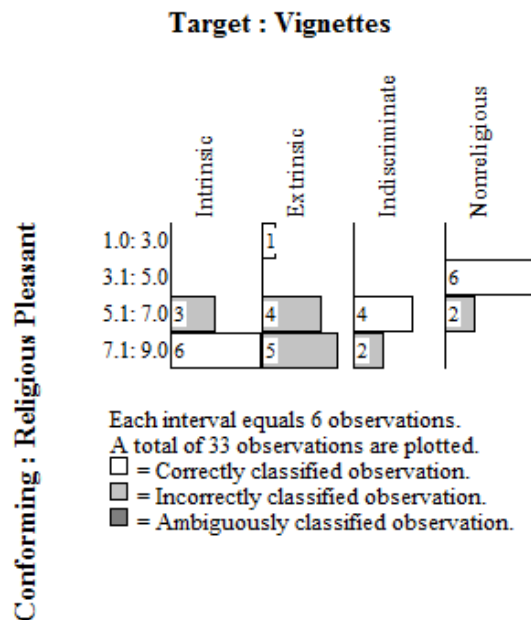


Figure 4. Multigram for Religious Orientation and Religious Pleasant.

Secondary Hypothesis

Since nominal data can be analyzed using an OOM pattern analysis without violating key assumptions, a pattern analysis was also conducted to assess the second hypothesis that the classification of participants into religious orientation groups using the vignettes was expected to match that of the Intrinsic/Extrinsic-Revised Scale. To recall, using the vignettes, participants were classified into one of the four religious orientations based on their agreement or disagreement with each of the two vignettes (one of which described an intrinsic orientation; the other described an extrinsic orientation). Median splits (Hood, 1970) were used to classify individuals based on their I/E-R scores. The pattern analysis was conducted by crossing the observations from both classification methods, using the Vignettes as the first ordering and the I/E-R as the second ordering. The predicted pattern was defined such that the classification of participants should match using both techniques (i.e., individuals should fall on the main diagonal). Figure 5 shows that the two classification methods matched relatively well, with 25 of the 35 participants (71%) being classified into the same religious orientation for both methods. A randomization test using 1000 trials revealed that the observed proportion of matches was not met or exceeded ($c < .01$), which indicates that these results were highly improbable. Mismatches (discussed below) were roughly equal across religious orientations for both classification methods.

| | | I/E-R | | | |
|-----------|----------------|-----------|-----------|----------------|--------------|
| | | Intrinsic | Extrinsic | Indiscriminate | Nonreligious |
| Vignettes | Intrinsic | 7 | 1 | 1 | |
| | Extrinsic | 1 | 7 | 2 | |
| | Indiscriminate | 2 | | 4 | |
| | Nonreligious | 2 | | | 7 |

Figure 5. Pattern analysis comparing classification methods. Shaded region denotes overlap in classification methods.

Further, the same analyses as above were conducted again using the I/E-R instead of the vignettes to classify individuals into religious orientations. Identical to what was reported above, Religious Pleasant was computed by averaging the participants' ratings of how pleasant each religious image was. Only the one participant who did not follow directions in completing the SAM was excluded from this analysis, leaving a total of 34 participants. The same four (approximately) equal units of observation were created for Religious Pleasant (i.e., 1.0: 3.0, 3.1: 5.0, 5.1:7.0, and 7.1:9.0) to coincide with the four religious orientations. Finally, in an attempt to discriminate between religious orientations, Religious Pleasant was conformed to Religious Orientations using the OOM rotation algorithm.

Although not identical, a similar pattern emerged using the I/E-R to categorize participants as did using the vignettes (see Figure 6). Eighteen of the 34 participants (52.94%) were correctly classified. The randomization results revealed that this percent correct classification (PCC) was not met or exceeded in any of the 1000 trials ($c < .01$), indicating that these results were improbable. Similar to the analysis above, the intrinsic individuals tended to rate the images as highly pleasant, and the nonreligious individuals tended to rate them the least pleasant. Again, the pattern is less clear for the extrinsic and indiscriminate individuals. However, the order for these two orientations was reversed compared to the results above, such that most of the indiscriminate individuals also rated the images as highly pleasant (consistent with the intrinsic individuals), and the extrinsic individuals tended to rate the images as more pleasant than did the nonreligious individuals but less pleasant than did the intrinsic individuals.

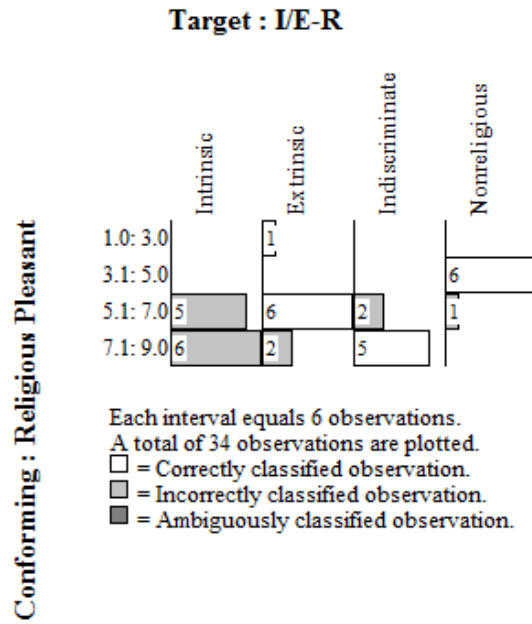


Figure 6. Multigram for I/E-R and Religious Pleasant.

Exploratory Analyses

Religious Behaviors and Demographics

Participants' reported religious behaviors (i.e., number of religious activities involved in over the past year, and number of services attended, hours spent praying, and hours spent reading the Bible over the past week) were all analyzed in OOM to see if they could be used to differentiate between the religious orientation groups (classified using the vignettes). Other than showing that the nonreligious individuals were least likely to report these behaviors, no clear pattern revealed the ability of the religious behaviors to differentiate between the groups. Demographic information (i.e., gender, age, and ethnicity) were also analyzed in OOM to see if these characteristics could differentiate between the religious orientation groups. None of the demographic characteristics were able to successfully differentiate between the religious orientation groups.

Conscious Ratings of the Standardized Images

Conscious ratings of the pleasantness of the positive, neutral, and negative images were also analyzed using OOM to examine 1) if the religious orientation groups were able to be differentiated and 2) if participants tended to rate these standardized images as would be expected. The religious orientation vignettes were used to form the religious orientation groups. Participants' average pleasantness scores on the positive, neutral, and negative images were computed to form the Positive Pleasant, Neutral Pleasant, and Negative Pleasant orderings, respectively. Two participants were excluded from these analyses (one for not following directions in rating the images, the other for not being able to be classified using the vignettes). Each pleasantness ordering was then conformed to the religious orientation ordering. None of the pleasantness orderings were able to differentiate between the religious orientation groups; participants tended to rate the images similarly regardless of their religious orientation. Participants also tended to rate the images as would be expected – positive images were typically rated as pleasant (Figure 7), neutral images were typically rated moderately (Figure 8), and negative images were typically rated as unpleasant (Figure 9).

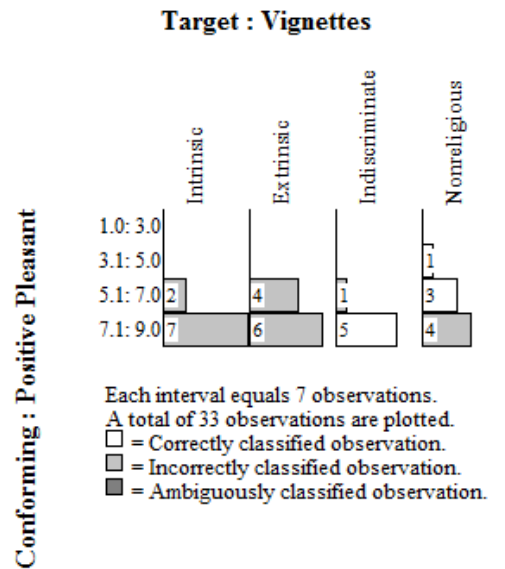


Figure 7. Multigram for Religious Orientation and Positive Pleasant.

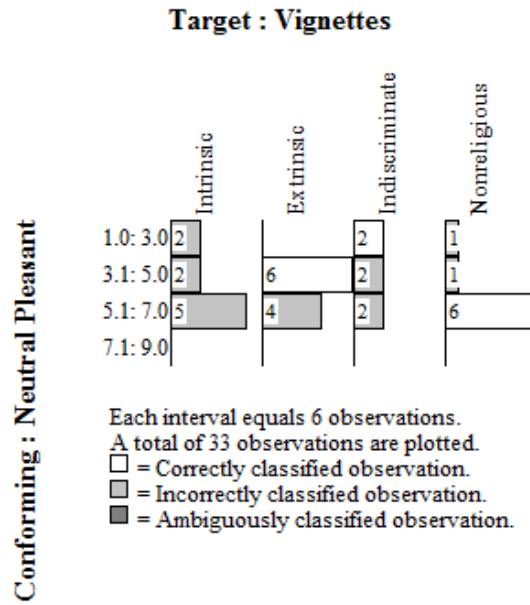


Figure 8. Multigram for Religious Orientation and Neutral Pleasant.

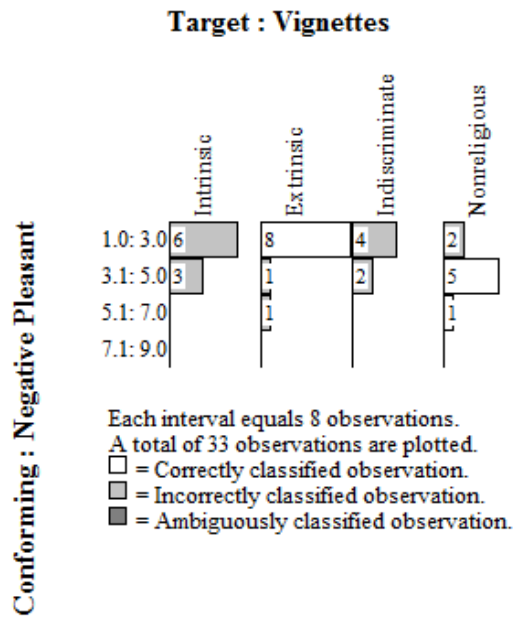


Figure 9. Multigram for Religious Orientation and Negative Pleasant.

Similarly, conscious ratings of the arousal of the positive, neutral, negative, and religious images were analyzed using OOM. Religious orientation groups were formed using the religious

orientation vignettes. Participants' average arousal scores were used to form Positive Arousing, Neutral Arousing, Negative Arousing, and Religious Arousing orderings. The same two participants as above were excluded from these analyses. Arousal orderings were then each conformed to the religious orientation ordering. None of the orderings were able to differentiate between the religious orientations. Participants were consistent in their arousal ratings across religious orientations. The positive and negative images tended to be rated as arousing (Figures 10 and 11, respectively), the neutral images tended to be rated as dull (Figure 12), and the religious images showed the most variability in how arousing they were rated across all four religious orientations (Figure 13).

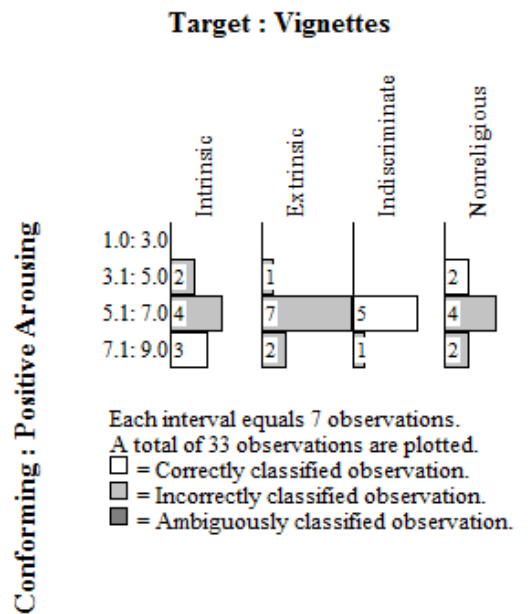


Figure 10. Multigram for Religious Orientation and Positive Arousing.

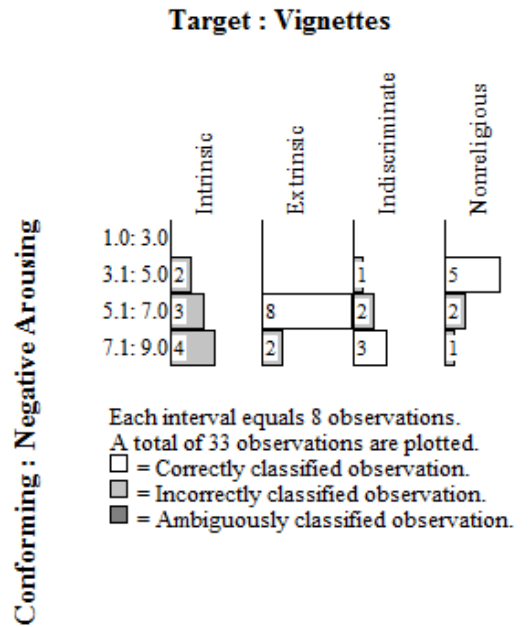


Figure 11. Multigram for Religious Orientation and Negative Arousing.

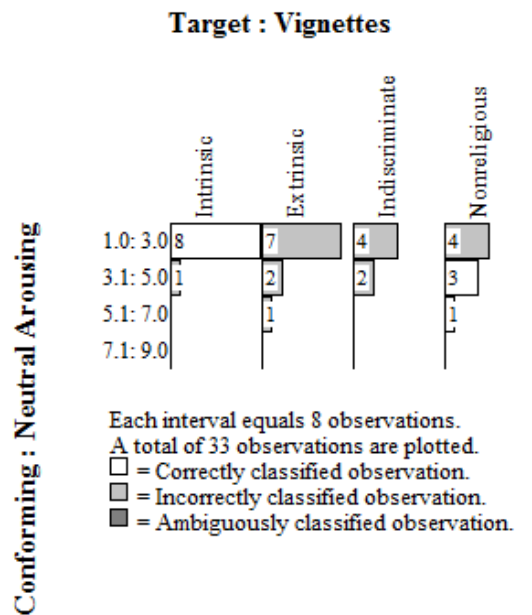


Figure 12. Multigram for Religious Orientation and Neutral Arousing.

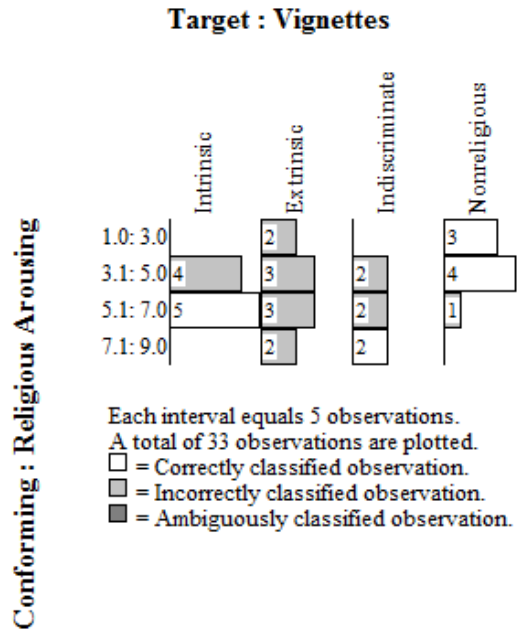


Figure 13. Multigram for Religious Orientation and Religious Arousing.

CHAPTER V

CONCLUSIONS

How Religious Motivations Affect One's Response to Religious Images

It has become increasingly apparent that it is important to consider the specific religious motivations of a person when trying to understand how one's religiosity affects various aspects of his or her life (Allport, 1966; Allport & Ross, 1967). In an effort to gain a deeper understanding of how one's religious motivations affect an individual's response to religious stimuli, the current study attempted to integrate this area of research with the flourishing area of reflex modulation. According to motivational priming theory (Lang, Bradley, & Cuthbert, 1990), individuals should experience a diminished startle response when presented with a positive stimulus and an exaggerated startle response when presented with a negative stimulus.

Various images that have been standardized as positive, neutral, or negative were employed in the current study to serve as the benchmark for comparison with participants' startle response (i.e., eyeblinks) to religious images. Unfortunately, the pattern of autonomic responding expected was not demonstrated in the vast majority of participants. Only 4 of the 35 participants – just over 10% – showed startle responses consistent with the theory; six participants responded in a manner that was opposite to the predicted pattern. These unexpected results rendered obsolete the goal of 1) discerning the emotional valence of participants' autonomic reactions to the religious images, and 2) differentiating between the religious orientation groups on that basis.

The validity of the theory for the affective modulation of the startle response does not

appear promising based on the current analyses. The standardized images all came from the IAPS database, designed for research of this nature (Center for the Study of Emotion and Attention, 1995), and protocol dictates that they be selected based on the aggregate conscious ratings of pleasantness and level of arousal. The pleasantness rating is used to determine the type of image (positive, neutral, negative), and the arousal rating is used to determine the effectiveness of the image (high arousal scores are ideal). These guidelines were followed in selecting the standardized images, and exploratory analyses showed that the participants tended to rate their pleasantness as would be expected. Although the neutral images tended to be rated as dull (contrary to what was expected), the arousal ratings for the positive and negative images tended to be rated as arousing (consistent with what was expected). Thus, the conscious ratings of the standardized images were, for the most part, rated as they were predicted to be. Participants' comments on the images provided further support that they were perceived as they were intended to be, despite some variability due to personal idiosyncrasies (see Appendix E for example participant comments). Despite this, the autonomic data did not produce results remotely close to what was expected and could not be used as a comparison to ascertain how participants responded to the religious images.

Turning instead to the participants' conscious ratings of the pleasantness of the religious images, these ratings were able to differentiate the religious orientations fairly well. Results indicated that it is important to consider the religious motivations of an individual in understanding how he or she responds to religious images (Allport, 1966; Allport & Ross, 1967). As expected, the intrinsic individuals tended to respond most favorably to the religious images. These individuals have internalized their religious convictions and attempt to use their beliefs to understand the world around them and to live devout lives, so it makes sense that they would rate the religious images – representations of these very beliefs – positively. Most extrinsic individuals and indiscriminate individuals also rated the religious images positively. It was

expected that extrinsic individuals would rate them slightly less positive than the intrinsic group because they have not internalized their religious beliefs, but extrinsic individuals tended to rate the images positively with an almost identical frequency as the intrinsic individuals. Their utilitarian motivations toward their religious beliefs conceivably afford them a positive perspective provided they are successful at achieving their goals. It would be interesting to see if their ratings would change if their goals (e.g., comfort, protection, social networking, economic gain) were thwarted. The indiscriminate individuals also tended to rate the images positively, though at a slightly lower rate than the intrinsic group. Why this might be the case is unclear. Overall, the three groups of individuals whose religious orientations imply that they have adopted (specifically Christian) religious beliefs into their lives in any form showed a propensity for rating the religious images positively. The nonreligious individuals tended to rate the images the least pleasant out of all of the religious orientations, likely a consequence of them not having incorporated religious beliefs into their lives at all – intrinsically or extrinsically.

Classifying Individuals into Religious Orientations

Another goal of the current study was to compare the standard methodology of classifying individuals into religious orientations with a new approach. One commonly employed method involves administering the Intrinsic/Extrinsic-Revised Scale (Gorsuch & McPherson, 1989) and using median splits to determine the cut points between the groups (Hood, 1970). This presents at least two potential issues: 1) nonreligious individuals often do not know how to respond to the items on the I/E-R, and 2) sampling bias can greatly affect the classification of individuals when median splits are used. In an attempt to overcome these challenges, two vignettes were written – one describing the intrinsic religious orientation, and the other describing the extrinsic religious orientation. Participants were then categorized based on their agreement or disagreement with how each vignette characterized their own religious orientation.

A pattern analysis revealed that the two classification methods provided the same results for 71% of the participants. Moreover, using the standard method to classify religious orientations produced results that were only slightly different than those obtained using the vignettes. Specifically, the indiscriminate group (as opposed to the extrinsic group) rated the images more similarly to the intrinsic group, and the extrinsic group (as opposed to the indiscriminate group) rated them as slightly less positive. In light of the overall consistency between the two methods, the use of the religious orientation vignettes seems to be a marked improvement over the typical protocol.

Differences in Responding to the Vignettes and the I/E-R

Participants were generally successful at responding to the vignettes and were also satisfied with the religious orientation they were assigned to. Only one person felt that she could not be correctly classified, discussed in more detail below. All other participants stated that their assigned religious orientation was an accurate description of their religious motivations. The explanations they provided also suggest that they gleaned an accurate understanding of what the vignettes were designed to convey (see Appendix F for examples of comments provided by participants from each religious orientation).

Moreover, the vignettes and the I/E-R both contain specifically Christian subject matter, but nonreligious individuals responded to the vignettes with greater confidence than the I/E-R. The vignettes offer a “does not apply” option. Although this option is scored the same as a “no,” nonreligious individuals may feel more comfortable responding with “does not apply” so as not to give the impression that they have any Christian beliefs. The I/E-R, on the other hand, leaves nonreligious individuals unsure of how to respond to many of the questions. Of the 9 participants identified as nonreligious on the vignettes, 8 skipped anywhere from 3 to 12 of the 14 questions on the I/E-R. Even though the scale midpoint is “Not Sure,” this is not a good option for an

individual who does not want to be included on the scale at all. For example, disagreeing with the item “I go to church because it helps me make friends” would mean two different things to an intrinsic and a nonreligious individual. Clearly, the nonreligious individual would prefer to skip this question. Yet, scoring becomes more complicated when items are skipped, which is why we chose to use average scores instead of the recommended summed scores.

Mismatches in Classification between the Vignettes and the I/E-R

Although there was a fair amount of overlap in classifying individuals using both the religious orientation vignettes and the I/E-R, there were some notable differences in how a few individuals were categorized. One individual was classified as intrinsic using the vignettes, but as nonreligious using the I/E-R. This obviously is troublesome considering an intrinsic individual is one who attempts to incorporate his or her religious beliefs into every aspect of his or her life, whereas a nonreligious individual does not ascribe those religious beliefs at all. Taking a closer look at this individual, she reported that she attends 2-3 religious services, prays 1-2 hours, and reads the Bible 2-3 hours during the typical week. Over the past year, she was involved in 12 additional religious activities. She reported “non-denominational (Christian)” as her religious affiliation. In her description of why she believes the intrinsic classification of the vignettes is an accurate description of her religious motivations, she wrote “I’m going through a rough time right now. I’ve grown up all my life in a Christian home and taught all the right things, accepted Jesus etc. So far college has been a rough transition and I sort of turned away even though at the beginning I was strong, but I’m trying to get everything back together and the faith I once had back on track.”

Based on her religious behaviors and reported affiliation, she certainly appears to be more of an intrinsic than a nonreligious individual. Her description of her religious motivations seems to indicate that she was in the midst of a trying season of her faith, not necessarily that she had

forsaken her faith altogether. Her classification as an intrinsic individual does appear to make sense, so why was she classified as nonreligious on the I/E-R? The difference appears to be the consequence of using median splits. She was the highest score below the median on the Intrinsic Religiosity subscale, just missing the cut point for what would have instead classified her as intrinsic. It is possible that the difficult time she was dealing with regarding her faith caused her to endorse the intrinsic items slightly lower on the Likert scale than she might have otherwise, resulting in a major change in how she was classified.

There were also two individuals who were classified as nonreligious using the vignettes but as extrinsic using the I/E-R. The distinction here is less extreme than between intrinsic and nonreligious, but is still notable. As a reminder, the extrinsic individual is one who uses religious for some utilitarian purpose, whereas the nonreligious individual does not. Neither of these religious orientations prescribes that the individual should have sincerely adopted the religious tenets into his or her life.

Of the two individuals whose classifications were mismatched in this manner, one reported his religious affiliation as Agnostic; the other reported Church of Christ (who is discussed again below). Both reported that they typically do not attend religious services (though the Church of Christ individual said he may occasionally attend one service), do not read the Bible, pray one hour or less per week, and are not involved in any other religious activities. In their descriptions of why a nonreligious classification accurately describes them (using the vignettes) it was clear that neither individual holds to the basic beliefs of the Christian faith.

So, why were the classifications different for these individuals using the vignettes and the I/E-R? For the Church of Christ individual, his score on the Extrinsic Religiosity subscale of the I/E-R was the lowest score directly above the median, just barely missing the cut point for being included among the nonreligious group. The Agnostic individual was not on the border between

being classified as extrinsic versus nonreligious, but he did skip three of the six extrinsic items on the I/E-R (and four of the eight intrinsic items). Despite using mean scores on each of the subscales as an attempt to handle missing data, it is likely that such a large proportion of missing data would still be troublesome.

Overall, these mismatches between classification methods are a cause for concern because the resulting categorizations can give rise to vastly different implications for the individuals. The mismatches appear to be the product of relying on statistical methods to classify individuals using the I/E-R, as well as nonreligious individuals not being able to answer the items on the I/E-R with confidence. The use of median splits was likely the culprit for two of the individuals discussed here, and the other individual may have been classified the same way using both techniques had his I/E-R responses not been plagued with missing data.

Statistical Basis of the I/E-R versus Theoretical Basis of the Vignettes

The I/E-R was driven by statistical techniques, whereas the vignettes were created using theoretical explanations. The items on the I/E-R have been dictated through a series of exploratory factor analyses, but the vignettes were created based on the theoretical descriptions of the religious orientations. Feagin (1964) noted a “halo effect” in I/E data – the intrinsic subscale was not very effective at differentiating individuals (i.e., there was not much variability in the data). This, coupled with the nonreligious group not being found among Allport and Ross’ (1967) sample, prompted the use of median splits (Hood, 1970) to form the groups. This method does form four groups of individuals whose religious orientations differ relative to one another, but they may not truly differ in terms of the actual definition of the religious orientation. The vignettes do not require the use of median splits to form the cut points from one orientation to the next. There was variability in responding to the vignettes, forming all four religious orientations.

They provide a much more straightforward method of forming the groups that will not vary based upon the sample and will allow a certain religious orientation to clearly be represented or not.

Additional Issues

Non-Normative Extrinsic Individual

As noted above, one of the extrinsic individuals (classified using both the vignettes and the I/E-R) rated the pleasantness of the religious images on the lowest unit of pleasantness. Although her average pleasantness score was a 2.9, which is at the top end of the lowest unit of observations, this was not normative for the extrinsic group as a whole (which tended to rate the religious images as pleasant) or for any of the other participants for that matter, including the nonreligious individuals (the next lowest score was a 3.6). Upon further investigation, this individual made comments on the religious images that reinforce this low pleasantness rating, such as “Mindless slaves to religion. Irritating.” and “Forced religion.” She indicated her religious affiliation as Episcopalian by her church attendance and Atheist by her beliefs. In response to the religious orientation vignettes, she added “I may attend church but only because I am forced or asked. I enjoy learned [*sic*] about some religion and I attend ever [*sic*] Sunday but Im [*sic*] atheist, and have been sence [*sic*] I was little. I am religious but I do not belive [*sic*] in what they teach.” She also indicated that she attends three religious services during the typical week. Although she does not spend time in prayer or read the Bible, she was involved in 23 religious activities other than religious services over the past year.

This individual provides a rather shocking example of an extrinsic religious orientation. She clearly has not internalized these religious beliefs, and yet remains active in regular church attendance and other involvement. Her religious motivations are likely utilitarian in nature, perhaps stemming from a desire for comfort, protection, economic gain, or social networking.

Individual not Classified using the Vignettes

Another individual was not comfortable being classified into any of the religious orientations. She responded “no” to each of the vignettes, but also did not feel that nonreligious was an accurate description of her religious orientation. Her explanation provides more insight into why she felt she did not belong in any of the groups: “I just know that church is not a social event. But I admit that I do not try hard to live up to my faith. I chose not to let intrinsic or extrinsic define me because I do not act according to either. I love God, but often don’t act like it.” She indicated that during the typical week she attends one religious service, prays less than one hour, and reads the Bible for less than one hour. Over the past year she was involved in five other religious activities. Although she did report some religious involvement, her comments on the images were by no means saturated with religious undertones. She commented “cute tree in middle” in response to a picture of the front of a church and “fingernails orange” in response to praying hands.

Although this individual does not adhere to an extrinsic religious orientation, she did not fall prey to Feagin’s (1964) “halo effect” either. Instead, she acknowledged that her behaviors are not typically characteristic of the intrinsic religious motivations that, perhaps, her love for God would predict. This deeper understanding was not able to be determined using the I/E-R; she was instead classified as having an intrinsic religious orientation.

Religious Affiliations

The individuals in the intrinsic, extrinsic, and indiscriminate groups all reported Christian religious affiliations, as would be expected (e.g., Catholic, Baptist, Presbyterian, Follower of Christ). Eight of the nine nonreligious individuals reported non-Christian affiliations (e.g., Atheist, Agnostic, Buddhist, None). One nonreligious individual (discussed above), however, reported his religious affiliation as Church of Christ. He also indicated that he has not been

involved in any religious activities over the past year, does not spend time reading the Bible, and, during the typical week, will maybe attend one religious service and spend up to an hour in prayer. In his explanation of why the nonreligious orientation accurately describes him, he stated: "...for all I know God is as true as some believe, and at the same time he may not be." This atypical member of the nonreligious group indicates the presence of nominal (or, perhaps, cultural) Christians: those who assign themselves to a Christian affiliation, but do not fully believe the tenets of the faith.

Religious Behaviors

None of the reported religious behaviors (religious services, time spent praying, time spent reading the Bible during a typical week or number of religious activities involved in over the past year) were able to successfully differentiate the four religious orientations, other than indicating that the nonreligious individuals were least likely to engage in any of these behaviors. In other words, the intrinsic, extrinsic, and indiscriminate individuals were all more likely to exhibit these behaviors than the nonreligious individuals, but they did not differ from one another in any clear way. This makes sense because the intrinsic individuals are likely to be involved in religious behaviors because they have incorporated their beliefs into how they approach their daily life; the extrinsic individuals are likely to be involved in religious behaviors for some utilitarian gain, and the indiscriminate individuals are likely to consist of some combination of the two. From the outside, then, it may very well be difficult to discern the religious orientation of a devout Christian from that of a nominal Christian. It is the internal state of their heart that drives the difference in their motivations for being religious.

Closing Remarks

The primary goal of this study was to combine the research on religious orientation with that on reflex modulation. Although motivational priming theory (Lang, Bradley, & Cuthbert,

1990) has been used in a variety of contexts (Amodio, Harmon-Jones, & Devine, 2003; Dempsey, Cohen, Hobson, & Randall, 2007; Gyurak & Ayduk, 2007), the results of the autonomic data gathered here indicated that the predicted effect was not present. The vital difference in this study and previous research is most likely the data analysis techniques employed. Whereas the current approach focused on the individuals in the study, standard analyses instead involve a great deal of aggregation. Specifically, the startle responses for each individual are typically converted to z -scores and then averaged for each category (i.e., positive, neutral, negative, religious). These averages are then routinely analyzed using null hypothesis significance testing, where abstract, population parameters are estimated. Unfortunately, though, the abstract, aggregate statistical effects are not always (or even usually) found at the level of the persons (Brown & Grice, 2012; Collins, Graham, & Flaherty, 1998; Von Eye, Mun, & Mair, 2009). Further research is needed, however, to ascertain whether a) the predicted pattern is truly present in most people and was not found here for some other reason, or b) the predicted pattern is in fact a statistical anomaly that is found only at the level of the aggregate.

Despite these unexpected results, there is still much that can be gleaned from this study. The four religious orientations were able to be differentiated based on their conscious ratings of the religious images, providing another example of the importance of understanding the specific religious motivations of an individual (Allport, 1966; Allport & Ross, 1967). Moreover, the religious orientation vignettes provide a more direct, applicable method of classifying individuals into their respective religious orientations compared to the standard technique. Participant comments indicate an accurate understanding of what the vignettes intended to convey and provide the means for a deeper understanding of their religious motivations.

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APPENDICES

Appendix A

Internal/External-Revised Scale

Please indicate the extent to which you agree or disagree with each item by using the following rating scale:

-2 = Strongly Disagree

-1 = Tend to Disagree

0 = Not Sure

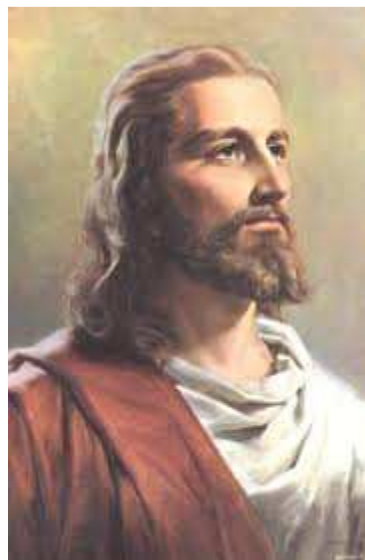
1 = Tend to Agree

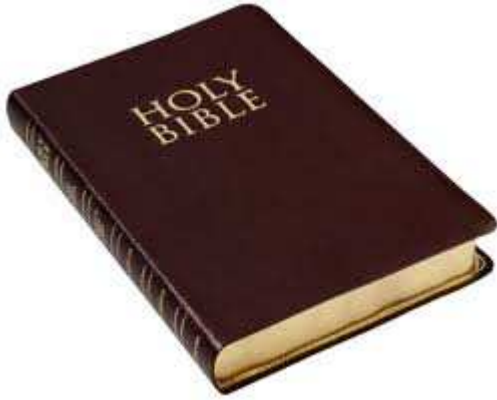
2 = Strongly Agree

1. I enjoy reading about my religion.
2. I go to church because it helps me to make friends.
3. It doesn't much matter what I believe so long as I am good.
4. It is important to me to spend time in private thought and prayer.
5. I have often had a strong sense of God's presence.
6. I pray mainly to gain relief and protection.
7. I try hard to live all my life according to my religious beliefs.
8. What religion offers me most is comfort in times of trouble and sorrow.
9. Prayer is for peace and happiness.
10. Although I am religious, I don't let it affect my daily life.
11. I go to church mostly to spend time with my friends.
12. My whole approach to life is based on my religion.
13. I go to church mainly because I enjoy seeing people I know there.
14. Although I believe in my religion, many other things are more important in life.

Appendix B

Religious Images





Appendix C

Religious Orientation Vignettes

People approach their religious belief system in a variety of ways. These religious experiences and motivations are referred to as an individual's religious orientation. Please read the descriptions of religious orientations below. Although the descriptions are not likely to apply perfectly to your life, please indicate whether each one mostly characterizes your own religious orientation.

Individuals with an **intrinsic** religious orientation approach everything in life from a religious perspective. These individuals attempt to let every aspect of their life – from minor daily activities to larger life-changing events – be guided by their religious beliefs. They rely on their religious beliefs to interpret events and experiences in life. They also look for how these events and experiences coincide with a larger plan and purpose using a religious point-of-view. They enjoy reading about and studying their religion and make it a priority to spend time in private thought and prayer. These individuals continually evaluate their life and strive to make adjustments when they notice inconsistencies with their religious beliefs.

Does this description primarily characterize your own religious orientation?

(Yes / No / Does not apply)

Individuals with an **extrinsic** religious orientation enjoy the comfort and protection that religion brings to their life. They pray primarily for happiness, which may include better health, finances, and other specific social comforts. These individuals also enjoy the social support network of the religious community. One of the things they look forward to the most about attending church is the opportunity to make friends or acquaintances. They particularly enjoy the opportunities that the church provides for fellowship and community, such as church-wide potlucks or small group gatherings, where they can spend time with friends. They find comfort knowing that the people they meet at church will be there for them when they are in times of trouble or sorrow.

Does this description primarily characterize your own religious orientation?

(Yes / No / Does not apply)

Appendix D

Religious Affiliation and Behaviors Questions

Religious Affiliation:

What is your religious affiliation? _____

Religious Behaviors:

How many religious services do you attend during a typical week? _____

Over the past year, how many religious activities, other than the religious services reported above, have you been involved in? _____

How many hours do you pray during a typical week? _____

How many hours do you spend reading and/or studying the Bible during a typical week? _____

Appendix E

Examples of Participants' Comments on the Standardized Images

Positive Images:

“Can I have all three?” (Image: Puppies)

“I can only imagine what I could do with the money.” (Image: Money)

“Oh my gosh that kid’s face is freakin’ awesome!” (Image: Kids on a rollercoaster)

“Romantic and peaceful.” (Image: Sunset)

“Pooping machine. I greatly dislike baby’s [*sic*].” (Image: Baby)

Neutral Images:

“Not interesting at all.” (Image: clothes)

“Plain, everyday object.” (Image: hair dryer)

“Not sure why I’m looking at the end of a light bulb.” (Image: Light bulb)

“No comment?” (Image: Filing cabinet)

“I don’t like ironing.” (Image: iron)

Negative Images:

“I really hated this one.” (Image: dog attacking)

“I’m don’t like guns pointing at me.” (Image: Person pointing a shotgun)

“Worst fear.” (Image: Shark)

“Hate snakes.” (Image: Snake)

“Bears are legit.” (Image: Growling bear)

Appendix F

Examples of Participants' Comments from each Religious Orientation

Intrinsic:

“God is the daily influencer of my life. The Bible is truth and I pray and study His word to spend time with him and be obedient not just for what He can do for me.”

“I go to church to learn more about my savior. I do not attend for social reasons. Seeing friends and family attend adds joy to my time in church, but it is not the reason why I attend. I would stick to going to church even if I had to attend by myself.”

Extrinsic:

“I go to church for more of the social aspect. I have good friends there that I know I can count on and they give me comfort. I love going to church to see my church friends. And I don't use religion in my everyday life.”

“I don't follow religion day by day and it doesn't affect how I run my life. I pray only in times of need and or trouble or sadness. I hop around to many different churches mostly with or because of friends and I enjoy the atmosphere within youth groups and the like.”

Indiscriminate:

“I believe that my beliefs are very important to my daily life. I enjoy going to church to fellowship with other Christians, but also to learn more about God. Prayer and quiet times are also a major part of my life.”

“I am motivated in my faith by both the truth and necessity to seek God simply because He is the truth, but I also believe you cannot easily do this on your own; you need others around you. So while I go to church to learn about God, I also go to interact with those close to me.”

Nonreligious:

“I believe religion [*sic*] are for the weak who cannot stand on their own. They must instill faith into something greater than themselves. I am not like that.”

“I live my life through common sense and do not let anyone else or blind faith guide my decisions in life. I make decisions based on how it affects myself and others. I make friends and acquaintances in any way, any place just by being friendly. I do not need or use religion to govern my life. However, I am open to the possibility of something being out there not unlike a god or deity. I just don't let organized religion or group think get in the way of my journey to find God, or whatever it is.”

VITA

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