WHAT MAKES IT MORAL? MEASURING DIFFERENCES BETWEEN MORAL AND NON-MORAL ATTITUDES

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Dedication

For my parents, Kelly and Brita.

For my husband, Matt.

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by

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Abstract

Moral attitudes have unique behavioral consequences. Theory predicts that moral attitudes are uniquely different than non-moral attitudes on a variety of dimensions. Of particular interest to the current study are two cognitive characteristics: objectivity, the belief that one's moral attitudes are factual and universality, the belief that one's moral attitudes ought to apply to everyone. These constructs have only been informally examined by a handful of studies. The aim of the current research was to examine the associations of morality to objectivity and universality using idiographic Implicit Association Tests. There were two primary hypotheses. The first hypothesis was that there would be faster reaction times for the expected associations (Objectivity IAT: fact/moral and opinion/non-moral; Universality IAT: self/non-moral and others/moral) than for the unexpected associations (Objectivity IAT: fact/non-moral and opinion/moral; Universality IAT: self/moral and others/non-moral). The first hypothesis was supported for the objectivity IAT, but the results were driven by an order effect. The universality IAT effect was non-significant. The second hypothesis was that morality would impact the congruity effect predicted by the first hypothesis. The second hypothesis was not supported for either IAT. Additional analyses reveled support for connections between moral attitudes and indices of attitude strength and unique differences between moral and non-moral attitudes. Implications for future research on morality, universality and objectivity, and the use of the IAT are discussed.

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Chapter 1: Introduction

Attitudes are an important knowledge base from which we evaluate the world around us (Fazio, 1999). The particular functional role of attitudes has been debated throughout the history of the study of attitudes. Fazio has argued that attitudes provide orientation toward a given object, promote meaningful categorization, and ease and enhance decision making. In short, an attitude allows us to determine how to behave toward the things around us. Attitudes, however, differ in how predictive they are of behavior (Glasman & Albarracin, 2006). Specifically, attitudes that are recalled easily and that remain stable over time are predictive of future behavior. Additionally, attitudes predict behavior when they are based on behavior-relevant information and direct experiences with the attitude objects. These characteristics indicate that attitudes have various qualities that must be considered when conducting attitude research. There are two methods of characterizing attitudes that are of particular interest in the current research. The first method classifies attitudes along a strength continuum (Fazio, 2007) and the second method classifies attitudes into three categories (Skitka, 2010).

1.1   Attitudes as Object-Evaluation Associations

Fazio (2007) describes an attitude as the association between an attitude object and a person's evaluation of that object. This characterization places attitudes along a continuum that characterizes the strength of its object-evaluation association. At one end of the continuum are non-attitudes, or attitude objects for which no attitude has been formed. At the other end of the continuum are strong attitudes where the object-evaluation association is well formed. Attitude researchers have developed a variety of methods for determining where certain attitudes fall along this continuum and how they influence our behavior. Attitude strength consists of several dimensions that make up the overarching construct (Krosnick, Boninger, Chuang, Berent, & Carnot, 1993). Using a multitrait-multimethod confirmatory factor analysis, Krosnick and colleagues have identified ten dimensions of attitude strength, such as,

attitude extremity, attitude certainty, attitude importance, and attitude accessibility. Attitude extremity, for example, measures how much a particular attitude deviates from the neutral, or non-attitude, mid-point on a bi-polar attitude scale. As the attitude deviates more from the mid-point, the attitude is considered more extreme and thus, stronger. Similarly, attitude importance measures the extent to which an individual places meaning and emphasis on a particular attitude. Again, greater importance indicates greater attitude strength.

Under the attitude strength classification of attitudes, the kinds of attitudes that are associated with, and predictive of, behavior are considered strong attitudes (Fazio & Williams, 1986; Fazio, Powell, & Williams, 1989; Glasman & Albarracin, 2006). For example, researchers were able to predict, with greater than chance accuracy, participants' selection of a "reward" based on their previous evaluation of that object; items for which participants had indicated having a strong attitude towards (e.g., potato chips) were chosen more often, and earlier than items for which participants had weaker attitudes (e.g., raisins; Fazio et al., 1989).

1.2   Attitudes as Categories

In addition to attitudes that vary by strength, attitudes are also thought to vary on other dimensions. There are several ways that attitudes can vary, for instance attitudes can be based on affective or cognitive information (Crites, Fabrigar, & Petty, 1994). Another qualitative distinction proposes three qualitative categories: preferences, social norms, and moral attitudes (Skitka, 2010). Preference-type attitudes reflect personal likes and dislikes and the influence of these attitudes on our behavior is rather direct. For example, I like the beach; when choosing vacations, I am likely to choose to go to the beach, rather than skiing because of that preference. Social norm- type attitudes tend to reflect cultural standards. For instance, attitudes toward women differ across cultures; in western cultures, attitudes toward women are more favorable than in middle-eastern cultures. Social norms have similar influences on our behavior as preference-type attitudes. Moral attitudes are characterized by

strong convictions that are related to our core beliefs and vary across individuals and cultures. The influence of moral attitudes on our behavior is unique, differing from non-moral attitudes (preferences and social norms) in several ways.

There are three important ways that moral attitudes are thought to differ from non-moral attitudes. Moral attitudes are viewed as more universal, objective, and emotionally driven than similar non-moral attitudes (Goodwin & Darley, 2008; Haidt, 2001; Skitka, 2010). Moral attitudes lead to a greater belief in universality; people tend to believe that their moral attitudes should apply to everyone, regardless of whom they are or where they live (Skitka, 2010). Additionally, people tend hold their moral attitudes more objectively (Goodwin & Darley, 2008; Haidt, 2001). For instance, a person who believes that abortion is morally wrong is likely to believe that its "wrongness" is a fact. Moral attitudes have also been shown to be more affectively based (Haidt, 2001, 2003) such that violations of people's moral attitudes lead to more intense emotions than violations of non-moral attitudes.

Another difference between moral and non-moral attitudes is the influence of moral attitudes on certain behaviors, primarily social behaviors (i.e., behavior toward others). When participants view a particular issue as moral, they report greater dislike for people in socially distant roles (e.g., grocer) than if the particular issue is viewed as non-moral (Skitka, Bauman, & Sargis, 2005). For example, participants with a moral attitude were more likely to avoid shopping at a store owned by a person with an opposing view than participants with a non-moral attitude. Similarly, when asked to sit in a room with another participant who has opposing views, participants will choose to sit farther away if the issue is a moral one. The influence of moral attitudes also extends to group settings. For instance, conflict resolution decreases when group members hold different moral viewpoints (Skitka et al., 2005). Moral attitudes also influence perceptions of fairness and authority (Skitka, Bauman, & Lytle, 2009). People are more likely to view court proceedings as less fair when the outcomes violate their moral attitudes

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and more fair when the outcomes support their moral attitudes, than when the central issue represents a non-moral attitude.

Classifying attitudes as belonging to particular categories, allows for clear distinctions to be made about the kinds of attitudes that influence on our behavior. Compared to non-moral attitudes, moral attitudes are viewed as more universal, objective, and emotionally based. Additionally, moral attitudes lead to greater social and physical distance, decrease conflict resolution, and influence perceptions of fairness, justice, and authority.

1.3   Moral Attitudes and Attitude Strength

Recent morality research has attempted to mesh the attitude strength characterization of attitudes and the qualitative categorization of attitudes, by understanding how they might be related. One hypothesis describing the relationship between these two conceptualizations of attitudes is that moral attitudes are the same as non-moral attitudes and that morality is another dimension of attitude strength. Linda Skitka and colleagues (for review see Skitka, 2010) have argued against this hypothesis, showing instead that the cognitive and behavioral differences between moral and non-moral attitudes (discussed above) are not explained by increased attitude strength. Specifically, attitude extremity, importance, and certainty measures have been correlated to moral conviction (average r's = .39, .28, and .20, respectively) but when included in analyses, fail to wholly account for the behavioral differences between moral and non-moral attitudes (Skitka et al., 2005).

The research conducted exploring the relationship between attitude strength and attitude categories promotes making distinctions between the two kinds of categorizations. There are, however, a few methodological issues that must be examined before embracing this distinction further. One such issue is that the attitude strength measures used in most morality research are not entirely consistent with the measures of attitude strength typically used in the attitude literature (see Krosnick et al., 1993). For instance, the measure of attitude importance used by Skitka and colleagues (2005), asked participants

"how important [the issue] was to them personally" (p. 899). This one item measurement of attitude importance may not capture the entirety of attitude importance. Instead, the more commonly used measurement found in attitude strength literature (e.g., Krosnick et al., 1993) consists of 5 items, that capture other aspects of attitude importance such as "how important the issue was to them compared with other issues" (p.1150). In order to more completely understand the relationship between moral attitudes and non-moral attitudes, more precise measurements of attitude strength may be necessary.

While the behavioral effects of holding moral attitudes are encouraging, there is very little research supporting the cognitive distinctions between moral and non-moral attitudes. Currently, moral researchers believe that moral attitudes are more universal, objective, and emotionally driven than non-moral attitudes. These claims, however, are primarily theoretical, based on only a few papers where the definition of these constructs is vague or inconsistent. As of yet, these hypotheses have not been clearly supported with empirical research.

1.4   Current Study

Because there is a lack of empirical research examining the cognitive dimensions of moral attitude, the goal of the current study is to determine how two of those dimensions, objectivity ("my belief is right or true", i.e., fact) and universality ("my belief should apply to everyone") explain differences in moral and non-moral attitudes using implicit measures. Secondarily, this research aims to develop constructs and methodology that can be used more consistently in the study of these dimensions. This research will explore a popular implicit measure, the Implicit Association Test (IAT).

1.4.1   The Implicit Association Test

The IAT was designed to measure implicit attitudes through automatic evaluation (Greenwald, McGhee, & Schwartz, 1998). During the task, participants evaluate two types of stimuli, for example, faces and affective words. The stimuli are first responded to separately, and responses are made using

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two keys; female faces are responded to with the left key and male faces with the right key. The same is then done separately with the second set of stimuli; positive words are responded to with the left key and negative words with the right key. Next the stimuli are combined into one set and participants make two different evaluations using the same key; face is female or word is pleasant judgments are responded to using the left key and face is male or word is negative judgments are responded to using the right key. In the fourth block, one set of stimuli is reversed and these new judgments are practiced; positive words are now responded to with the right key and negative words with the left key. In the second combined block, the last block, the stimuli are again shown as one set and some of the responses differ; female faces/negative words are responded to with the left key and male faces/positive words are responded to with the right key. Responses to the two combined tasks can be used to determine differential associations between the two types of stimuli. For instance, if participants are faster when female/positive are responded to using the same key, than when female/negative are responded to using the same key, then it is thought that participants prefer female faces.

Since its inception, the IAT has been a popular task for measuring implicit attitudes. The flexibility of the IAT is one of the reasons for its popularity. The IAT task has been adapted to measure a variety of associations such as stereotypes, prejudice, self-concepts, and motivations (Gawronski, Deutsch, & Banse, 2011). The task has also been shown to predict explicit measures and behavior (e.g., McConnell & Leibold, 2001) and generate large effect sizes (ds > 1.3, Greenwald et al., 1998) compared to other implicit measures (e.g., evaluative priming, $d = .37$, Herring et al., 2013).

1.4.2   Study Overview

The current study will attempt to adapt the IAT to measure associations between attitudes and two of the dimensions, universality and objectivity, that have been proposed as distinguishing moral from non-moral attitudes. During a pre-screening phase, participants will make morality and attitude judgments toward a variety of issues. These ratings will be used to determine which moral and non-moral attitudes

are presented during idiosyncratic IATs, in a later experimental session. During the experimental session, participants will complete a Fact-Opinion (objectivity) IAT, measuring the association between moral attitudes and objectivity, and a Self-Other (universality) IAT, measuring the association between moral attitudes and universality.

1.4.3   Hypotheses

The first hypothesis is that there will be a congruity effect. For the objectivity IAT (Hypothesis 1a), a congruity effect will be demonstrated by faster response times when fact/moral judgments are paired and opinion/non-moral judgments are paired (expected association) than when fact/non-moral judgments are paired and opinion/moral judgments are paired (unexpected association). For the universality IAT (Hypothesis 1b), a congruity effect will be demonstrated by faster response times when other/moral judgments are paired and self/non-moral judgments are paired (expected association) than when other/non-moral judgments are paired and self/moral judgments are paired (unexpected association).

The second hypothesis is that the congruity effect will be affected by the morality of the judgments, demonstrated by a significant congruity-morality interaction. For the objectivity IAT (Hypothesis 2a), the interaction will involve a greater difference in reaction times between the expected (fact/moral and opinion/non-moral) and unexpected (fact/non-moral and opinion/moral) association when the judgments are moral than when the judgments are non-moral, as depicted in Figure 1.1
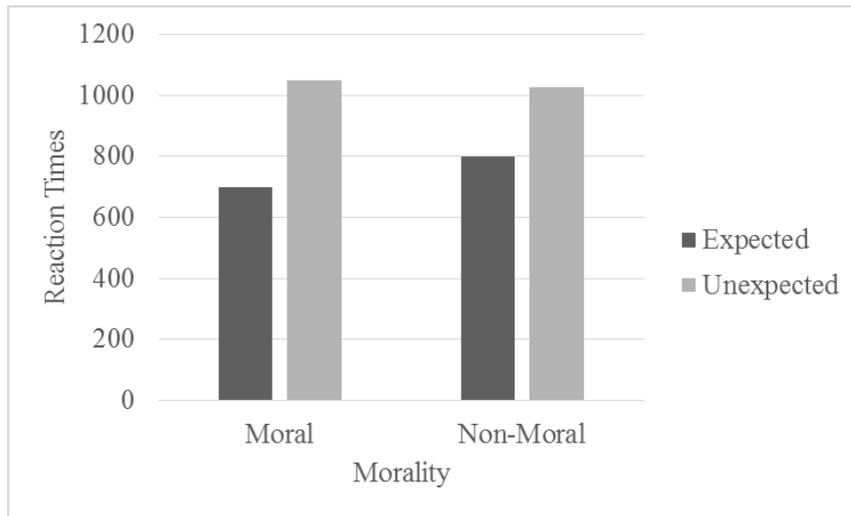
Figure 1.1: Hypothesized congruity-morality interaction for the objectivity IAT.

For the universality IAT (Hypothesis 2b), the interaction will involve a different pattern of effects for the moral judgments than for the non-moral judgments, as illustrated in Figure 1.2. Specifically, the morality judgments would be equally associated to self and others, with similar reaction times across blocks, but that non-moral judgments would follow the typical pattern, with faster reaction times in expected association block (non-moral/self) than in the unexpected association block (non-moral/others).

Figure 1.2: Hypothesized congruity-morality interaction for the universality IAT.

Chapter 2: Method

2.1 Prescreen Session

2.1.1 Participants

Three hundred twenty eight participants were recruited from the Introduction to Psychology pool and received partial course credit for their participation.

2.1.2 Materials and Procedure

Participants completed an online survey (Qualtrics, 2014) measuring morality and attitudes towards social issues. The survey was completed in an online session at the participants' convenience. Participants were directed first to the informed consent form and then proceeded to the survey using a separate link if they agreed to participate. During the survey, participants completed moral conviction, global attitude, and attitude strength scales for 17 issues: abortion, gay marriage, torture, animal research, cheating, incest, death penalty, illegal drugs, gun control, tattoos, recycling, drones, stem cell (research), euthanasia, pre-marital sex, Wiki-Leaks, and speeding. Many of the social issues included in the survey were selected from previous research that identified average moral and non-moral ratings of participants for 41 issues (Wright, Cullum, & Schwab, 2008). Issues were selected with the intention that some issues would be more commonly moral (e.g., Abortion; moral for 25% of participants) and more commonly non-moral (e.g., Speeding; moral for 2% of participants). Other social issues were included that were similar in nature and were current "hot topics" in politics and the media.

Moral Conviction

Moral conviction was measured using a four-item scale (*Cronbach's α* = .99; see Appendix A for complete measures) developed by Skitka (2011). Scale items are: "To what extent is your position on [issue] 1. ...a reflection of your core moral beliefs and convictions? 2. ...connected to your beliefs about

fundamental right and wrong? 3. ...based on moral principle? 4. ...a moral stance?" Participants responded using a scale from 1 (*not at all*) to 7 (*extremely*). Higher scores indicated greater moral conviction.

Attitude

Attitude was measured using an abbreviated scale with three items adapted from Crites, Fabrigar, and Petty (1994). Participants reported the extent to which the adjective pairs Negative-Positive, Bad-Good, and Dislike-Like described their opinions about each issue on 7-point bipolar scales ranging from -3 (*e.g., Negative)* to +3 (*e.g., Positive)*, with midpoint 0 (*neutral)*. Overall positive scores indicated a positive attitude and vice versa.

Attitude Strength

Attitude strength was measured using the item: "To what extent do you feel "strongly" about [issue]?" Participants responded on a 1 to 7 scale, with higher scores indicating greater attitude strength.

2.1.3   Selection Procedure

After the survey was completed, responses were reviewed by the experimenter and research assistants. For each issue, the sum of the moral conviction items, the overall valence of the attitude items (either negative or positive), and the value of the strength item was recorded. The experimenter then determined if the participants reported at least three moral issues and three non-moral issues. Moral issues were defined as having a summed moral conviction score greater than 20 (scores on each item were rated 5 or higher, indicating high moral conviction) and non-moral issues were defined as having a summed moral conviction score less than 12 (scores on each item were rated 3 or lower, indicating low moral conviction). If more than three issues of either morality were reported, further selection criteria were applied. If possible, for each type, moral and non-moral, at least one issue was selected that the participant reported having a positive attitude toward, and one that the participant reported having a negative attitude toward. Similarly, issues were selected based on strength so that issues with greater strength were selected and if possible, matched across morality so that moral and non-moral issues were held with equal strength.

If participants held three moral and three non-moral attitudes, they were contacted via email and invited to participate in the experimental session for additional research credits. One hundred twenty-two participants were contacted to participate in the current study, of which 73 responded. Ineligible participants were also contacted via email and invited to participate in another study.

Using the selection criteria outlined above, participants had an average of 7.10 (SD = 3.89) moral issues out of 17 total issues. Similarly, participants had an average of 4.43 (SD = 3.68) non-moral issues. Compared to previous research about morality, which suggests that moral attitudes are rare, the increase in morality in this population is surprising. For example, in previous research, participants identified Abortion as a moral issue approximately 25% of the time, whereas in the current study, 47% of participants identified it as a moral issue (Wright et al, 2008). Similarly, 2% of participants in previous research identified speeding as a moral issue whereas 30% of participants in the current study identified speeding as moral. Moral attitudes were primarily negative attitudes (60%), compared to non-moral attitudes where only 39% were negative attitudes. A summary of the attitudes is displayed in Table 2.1. Tables showing morality classification and attitude valence by issues are in Appendix E.

Table 2.1: Attitude by morality summary

	Positive		Negative		Neutral	
	Total	Percentage	Total	Percentage	Total	Percentage
Moral	720	31%	1385	60%	203	8.8%
Non-Moral	505	35%	562	39%	374	26%

2.2   Experimental Session

2.2.1   Participants

Seventy-three (52 Female) participants were recruited from the eligible prescreen participants. Participants' ages ranged from 17 to 48, with an average age of 21. Similar to the local population, 74% of participants identified as Hispanic and 55% reported Catholic religious affiliation. Participants' political affiliation averaged slightly liberal to neutral ($M = 3.5$; scale of 1 "extremely liberal", 4 "neither", 7 "extremely conservative").

2.2.2   Materials and Procedure

Overview

Participants completed the experiment in person. Upon arrival, they completed consent and demographic forms (Appendix B). Prior to beginning the IATs, participants confirmed their morality toward the selected issues and completed attitude and attitude strength measures for each issue. Participants then completed two IATs. One IAT measured the association between objectivity and morality and the other measured the association between universality and morality. After the experiment, participants were debriefed, thanked for their participation, and granted credit.

Attitude

Attitude was measured with nine items (*Cronbach's α*'s > 0.9) adapted from Crites, Fabrigar, and Petty (1994). Participants reported the extent to which the adjective pairs Sorrow-Joy, Angry-Relaxed, and Disgusted-Acceptance described their emotions about each issue. Participants also reported the extent to which the adjective pairs Harmful-Beneficial, Unwise-Wise, and Unhealthy-Healthy described their thoughts about each issue. Responses were made using a 7-point bipolar scales ranging from -3 (*e.g., Sorrow)* to +3 (*e.g., Joy)*, with midpoint 0 (*neutral*). The remaining three items were added to the score

from the attitude items measured during the prescreen survey (endpoints Negative-Positive, Bad-Good, Dislike-Like). Overall positive scores indicated a positive attitude and vice versa.

Attitude Certainty

Attitude certainty (Petrocelli, Tormala, & Rucker, 2007) measured the extent to which the participant is certain about their attitude towards each issue with seven items (e.g., To what extent is your true attitude toward [issue] clear in your mind). Participants responded to the items on a scale from 1 (*not at all*) to 7 (*extremely*). Higher scores indicated greater certainty.

Attitude Importance

Attitude importance (Krosnick et al., 1993) measured how important the expressed attitude is to the participant using three items (e.g., How important is the issue of [issue] to you personally). Participants responded to the items on a scale from 1 (*not at all*) to 7 (*extremely*). Higher scores indicated greater importance.

Implicit Association Tasks

Two IATs measuring the association between objectivity and morality and the association between universality and morality were used (description below). Participants were randomly assigned to complete either the objectivity IAT or the universality IAT first, followed by the other. After completing the first IAT, participants were given the opportunity to take a five minute break and proceeded to the second IAT at their own convenience.

Objectivity Implicit Association Task. The objectivity IAT measured associations between morality and objectivity. The IAT consists of five blocks of trials. Blocks 1, 2, and 4 are practice trials during which participants practice making judgments of the stimuli using the assigned keys. In block 1, participants practiced categorizing statements as fact or opinion. Participants were instructed to respond as quickly and accurately as possible. Participants responded to "fact" stimuli (e.g., Mars is Red, stimuli

are listed in Appendix C) by pressing the left button, and "opinion" stimuli (e.g., Art is fun) by pressing the right button. The assigned response keys for all judgments were counter-balanced across participants such that half of participants responded to stimuli with the left key and half responded with the right key. The fact/opinion stimuli were presented centrally on the screen in blue font. The judgment categories "Fact" and "Opinion" were displayed in the upper corners of the screen and matched the assignment of the response keys (i.e., if "Fact" response is made with the left key, "Fact" was displayed in the upper left hand corner). Categories were also displayed in blue font. An "X" flashed on the screen after incorrect answers, however participants did not have the opportunity to correct any errors.

In block 2, participants practiced categorizing statements as moral or non-moral. Participants were instructed that the categorizations in this block were based on their prior ratings (which were confirmed before the experiment). Participants responded to "moral" stimuli by pressing the left button, and "non-moral" stimuli by pressing the right button. For instance, if the issue of abortion was identified as a moral issue during the issue selection phase, "Abortion" was responded to using the left button; if abortion was identified as a non-moral issue, the issue was responded to using the right button. The moral/non-moral stimuli were presented centrally on the screen in red font. The judgment categories "Moral" and "Non-Moral" were displayed in the upper corners of the screen and matched the assignment of the response keys. Categories were also displayed in red font. An "X" flashed after incorrect answers. In block four, participants practiced making moral/non-moral categorizations using response keys opposite to those used in block 2. Participants responded to "moral" stimuli by pressing the right button, and "non-moral" stimuli by pressing the left button.

Blocks 3 and 5 are the critical blocks where the associations are measured. Block 3 is the first critical block. In this block, both fact/opinion and moral/non-moral stimuli were displayed and appeared in random order. Participants made whatever judgment was appropriate based on the previous practice blocks. To facilitate the appropriate judgments, stimuli and judgment categories were displayed in the font

colors from the practice trials; fact/opinion stimuli were presented in blue font, and moral/non-moral stimuli were presented in red font. Participants responded to "fact" stimuli and "moral" stimuli by pressing the left button, and "opinion" stimuli and "non-moral" stimuli by pressing the right button. Matching these response key assignments, the judgment categories were displayed in the upper corners in the same font colors as the stimuli. In the upper left hand corner, "Fact" was displayed in blue font and "Moral" was displayed in red font. In the upper right hand corner, "Opinion" was displayed in blue font and "Non-Moral' was displayed in red font. An "X" flashed after incorrect answers.

Block 5 is the second critical block. In this block, the fact/opinion stimuli and the moral/non-moral stimuli are again displayed together in random order and participants made whatever judgment was appropriate. Stimuli were displayed in different font colors depending on the judgment (blue font for fact/opinion and red font for moral/non-moral). In this block response keys for moral judgments were switched to match the new response key practiced in block 4, however fact judgments were made with the same key used in blocks 1 and 3. Participants responded to "fact" stimuli and "non-moral" stimuli by pressing the left button, and "opinion" stimuli and "moral" stimuli by pressing the right button. Matching these response key assignments, the judgment categories were displayed in the upper corners in the same font colors as the stimuli. In the upper left hand corner, "Fact" was displayed in blue font and "Non-Moral" was displayed in red font. In the upper right hand corner, "Opinion" was displayed in blue font and "Moral' was displayed in red font.

Figure 2.1 shows an example of the IAT sequencing. IAT sequencing was counter-balanced in an attempt to overcome block order effects. For half of participants, block 3 response key assignment paired fact and moral judgments and block 5 response key assignment paired fact and non-moral judgments. For the other half of participants, block 3 response key assignment paired fact and non-moral judgments and block 5 response key assignment paired fact and moral judgments. Following suggested protocol for IATs (Gawronski et al., 2011), blocks 1 and 2 (of each IAT) consisted of 20 practice trials

each. Block 4 consisted of 40 practice trials (as an attempt to overcome block order effects). The critical

blocks, 3 and 5, consisted of 60 total trials with 20 practice trials and 40 critical trials. The inter-trial

interval was 250ms. Reaction times were measured from stimulus onset to decision. Error rates were

also measured. Experimental presentation and data collection were conducted with E-Prime (Version

2.0, 2012) software.
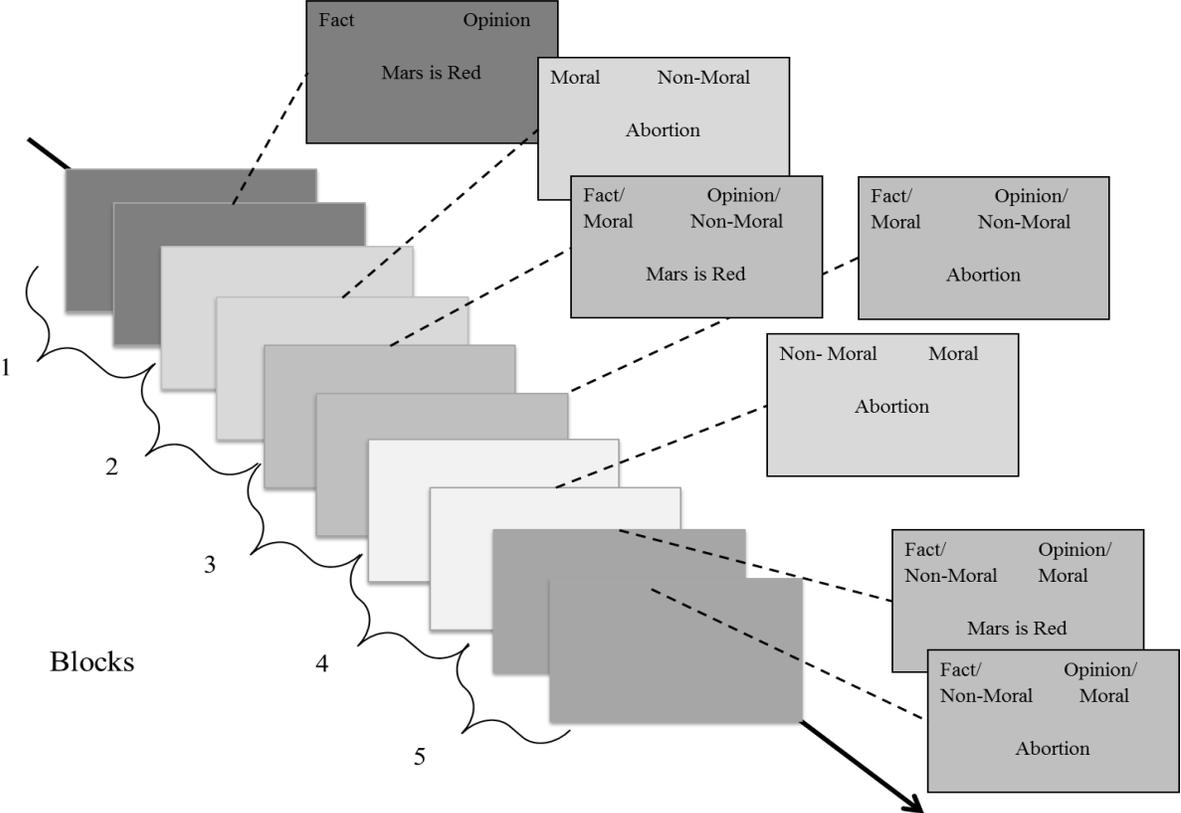
Figure 2.1: Example of IAT sequencing

Universality Implicit Association Test. The universality IAT measured the association of self and

others with morality, intending to understand the universality of moral attitudes. This IAT proceeded as

above, replacing fact/opinion categorization with categorization of words relating to "self" (e.g., me) or

"others (e.g., they); stimuli are listed in Appendix C.

Chapter 3: Results

Sixty five participants were included in the analyses. Two participants were excluded due to technical problems during the experiment and six were excluded after the experiment due to programming errors (e.g., incorrect stimuli used in the program).

3.1   Exploratory Analysis: Practice Effects

In the literature, IAT analyses vary on the inclusion of practice trials from the critical blocks; some studies include them (e.g., Slabbinick, DeHouwer, & Van Kenhove, 2011), other studies exclude some (e.g., Richetin, Richardson, & Mason, 2010), and for other studies, it is unclear (e.g., Waller, Lampman, & Lupfer-Johnson, 2012). Inclusion or exclusion is particularly important to consider in the current study because the objectivity IAT includes longer stimuli than used in previous research, which might require more practice to stabilize reaction times. To explore this effect, paired t-tests were conducted for the objectivity IAT on all trials and on only the critical trials to determine whether practice trials should be included in the subsequent analyses. The results for inclusion and exclusion of the practice trials are summarized in Table 3.1. Excluding practice trials led to more stable findings, with smaller standard deviations, an increase in the statistical significance (i.e, smaller p-values), and larger effect sizes. These results led to the exclusion of practice trials from the remaining analyses reported below.

Table 3.1: Comparison of t-test results with and without practice trials: Objectivity IAT

	$M_{difference}$	SD	T-value	p-value	Cohen's d
Across Conditions					
With Practice	98.432	320.351	2.477	.016	0.249
Without Practice	101.375	298.429	2.739	.008	0.330

Reaction Times are reported in MS.

3.2   Objectivity IAT

The objectivity IAT was constructed to measure the association between objectivity and morality, based on theory that suggests that people view their moral attitudes as factual.

3.2.1   Hypothesis Testing

Hypothesis 1a

The first hypothesis was that there will be a congruity effect. For the objectivity IAT, a congruity effect is demonstrated by faster response times when fact/moral judgments are paired and opinion/non-moral judgments are paired (the expected association) than when fact/non-moral judgments are paired and opinion/moral judgments are paired (the unexpected association).

The congruity effect was tested using the D-600 Algorithm. This algorithm was developed and tested psychometrically in order to increase the size and stability of the IAT effect (Greenwald et al., 2003). Based on the exploratory analyses reported above, the algorithm used in the current study only used the critical trials. The D-600 algorithm was calculated using the following steps: 1) calculated the mean reaction time of correct trials only for the critical trials in block 3 and the critical trials in block 5; 2) calculated the standard deviation of correct trials only for the combined critical trials in blocks three and five; 3) error trials were re-scored so that they equal the mean of their respective block plus 600ms[1] (e.g., if the error trial is from the critical trials in block three, it is rescored to equal mean of correct critical trials in block three plus 600ms); 4) calculated new mean reaction times for each set of trials that include the newly scored error trials; 5) calculated a difference score that subtracts the mean reaction time of the trials measuring the unexpected association (e.g., fact/non-moral) from the mean reaction time of the trials measuring the expected association (e.g., fact/moral; i.e., either block five minus block three or block

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[1] To determine how substituting errors with an adjusted value, paired t-test analyses were conducted on the raw RTs. Results are displayed in Appendix D. The results were similar across analyses.

three minus block five, depending on condition) for the critical trials; 6) calculated a D score by dividing the critical trial difference score by the critical trial standard deviation. A positive D score indicates an association in the expected direction.

Results. The D algorithm was applied to the objectivity IAT to examine a difference in reaction times for the expected association (fact/moral and opinion/non-moral) and the unexpected association (fact/non-moral and opinion/moral). D score results indicate a significant positive association between objectivity and morality, $D = 0.225$, $SD = 0.478$, *95% CI* $= 0.106$, 0.343. Thus the expected association block ($M = 1064$ms, $SD = 357$ms) had faster reaction times than the unexpected association block ($M = 1166$ms, $SD = 363$ms), $M_{difference} = 101$ms, $SD = 298$ms.

Separate D scores were calculated for the between subject order variable. Although order effects were not predicted, there was a significant critical block order effect, such that one order showed a significant IAT effect and the other did not. Figure 3.1 illustrates the order effects. Participants who received the unexpected association in the first critical block followed by the expected association in the second critical block demonstrated a significant association between objectivity and morality, $D = 0.319$, $SD = 0.402$, *95% CI* $= 0.169$, 0.469. The expected association block ($M = 965$ms, $SD = 315$ms) had faster reaction times than the unexpected association block ($M = 1145$ms, $SD = 448$ms), $M_{difference} = 180$ms, $SD = 244$ms. Participants who received the expected association in the first critical block followed by the unexpected association in the second block demonstrated no significant association between objectivity and morality, $D = 0.144$, $SD = 0.526$, *95% CI* $= -0.037$, 0.325; $M_{difference} = 33$ms, $SD = 326$ms.
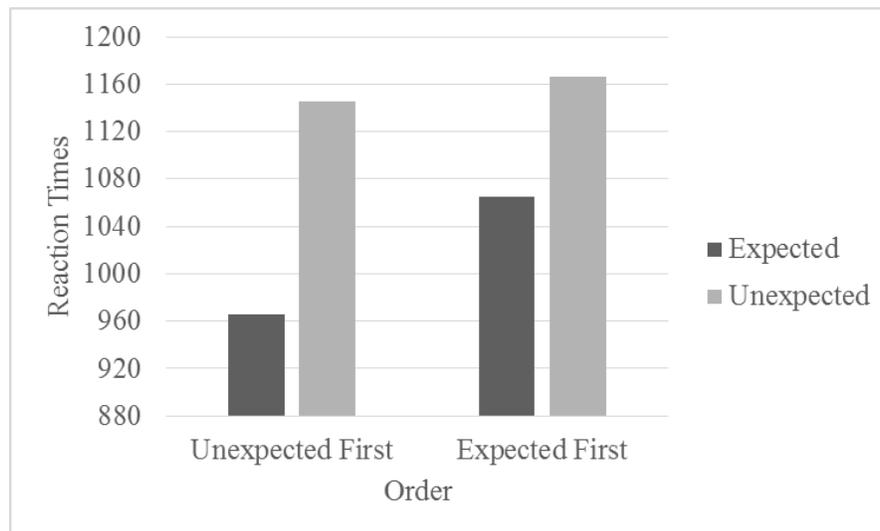
Figure 3.1: Order Effects on D Score: Objectivity IAT

Hypothesis 2a

The second hypothesis was that the congruity effect described in Hypothesis 1a would be affected by the morality of the judgments, demonstrated by a significant congruity-morality interaction. For the objectivity IAT, the interaction would involve a greater difference between the expected and unexpected association when the judgments are moral than when the judgments are non-moral. The hypothesized interaction is illustrated in Figure 1.1. The interaction effects were tested using a 2x2x2 Mixed ANOVA examining Congruity (expected association and unexpected association; within-subjects) by Morality (moral and non-moral; within-subjects) by Order (unexpected association first or second; between-subjects). The order variable was included based on the significant order effects found with the D analysis. The dependent variable was adjusted reaction time[2]. In order to examine the morality effects, the only trials that were included in these analyses are those in which the moral/non-moral judgments were made, in the critical blocks. Practice trials and the trials where fact/opinion judgments were made were excluded.

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[2] The exclusion criteria and adjusted reaction times from the D-600 algorithm were used in the ANOVA calculations. Adjusted RTs are for error trials where the adjusted RT is equal to the block mean + 600ms.

The results of the ANOVA confirmed the results of the D-600 algorithm, using a subset of the trials used in the D score calculations; there was a main effect of congruity. The expected association trials (M = 1109ms, SD = 447ms) were responded to significantly faster than the unexpected association trials (M = 1197ms, SD = 425ms), $F(1,63)$ = 5.150, p = .027. Also like the D scores, the congruity effect was driven by a significant congruity-order interaction, $F(2,63)$ = 6.024, p = .017. The interaction was probed using paired t-tests where the reaction times from the unexpected association block are subtracted from the reaction times from the expected association block. When the unexpected association was presented before the expected association, reaction times for the expected association (M = 980ms, SD = 375ms) were significantly faster than reaction times for the unexpected association (M = 1181ms, SD = 517ms), $M_{difference}$ = 201ms, SD = 309ms, d = 0.065, $t(29)$ = 3.561, p = .001, 95% CI = 85.602, 316.619. There was no significant congruity effects for the reverse order (when the expected association was presented before the unexpected association), $M_{difference}$ = -7.884, SD = 367.633, d = 0.022, $t(34)$ = -0.127, p = .900, 95% CI = -134.280, 118.516.

There were no significant effects of morality. Moral stimuli (M = 1155ms, SD = 406ms) were categorized equally as fast as non-moral stimuli (M = 1152ms, SD = 423ms), $F(1,63)$ = 0.004, p = 0.951). The predicted congruity by morality interaction was non-significant ($F(2,63)$ = 0.264, p = 0.609). Figure 3.2 illustrates the results of the morality-congruity interaction.
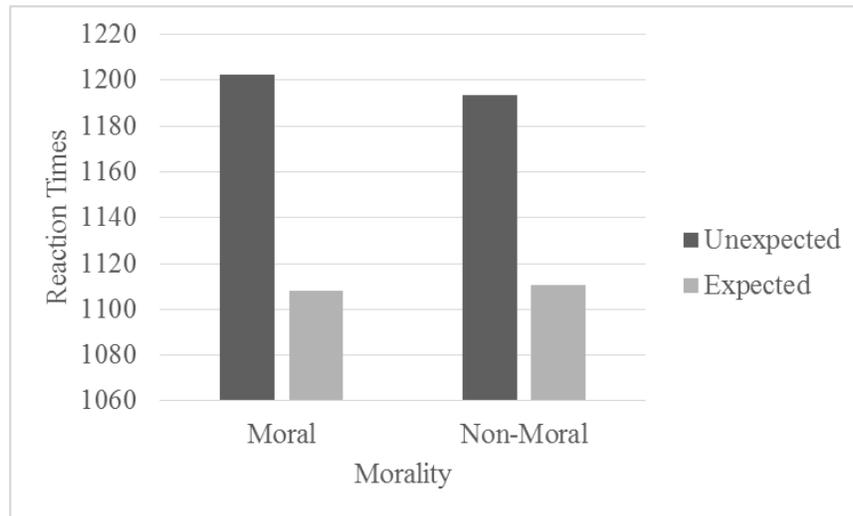
Figure 3.2: Congruity-Morality interaction: Objectivity IAT

3.2.2 Multilevel Modeling-A

For the purposes of the study, issues were selected in a dichotomous manner (moral or non-moral) so a dichotomous judgment could be made, however these issues are much more complex. Each issue varies in the strength of the moral conviction as well as other measured covariates such as attitude strength. The traditional IAT analytical techniques cannot account for these differences. Participants also vary in political and religious affiliations that could systematically influence which issues were selected and the strength of their moral convictions and overall attitude towards them. Because of these complexities, exploratory multi-level modeling was applied to these data in order to more completely parse out the associations between objectivity and morality.

Model Definition. The model consists of 3-levels with repeated measures nested within blocks, nested within participants. The null model, summarized in equation 1, estimates average reaction time across trials, blocks, and participants[3].

$$RT_{ijk} = \gamma_{000} + v_{00k} + u_{0jk} + e_{ijk} \qquad (1)$$

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[3] The current study used non-transformed RTs which seems to result in very large SEs (see also Basak & Verhaeghen, 2003). Other studies examining RTs using a log-transformation result in smaller SEs (e.g., Kiselev, Espy, & Sheffield, 2009). MLM analyses on log-transformed RTs were conducted for the current studies and similar trends were found, with smaller SEs.

In equation 1, γ_{000} denotes the grand mean (across trials, blocks, and participants), v_{00k}, denotes participant error, u_{0jk} denotes block error, and e_{ijk} denotes trial error. Residual variance is also measured. Significant residual variance at any level signifies that additional parameters can be added to the model at that level and its effects can be estimated. Level-1 parameters of interest are moral conviction, attitude valence, attitude certainty, and attitude importance. The Level-2 parameter of interest is block congruity (expected or unexpected association). Level-3 parameters of interest are block order, political affiliation, and gender.

The following models were estimated using Full Information Maximum Likelihood (FIML), which allowed for quantitative comparisons between nested models. Model analysis were conducted using the MUTLILEV module of LISREL 9.1, student edition (Jöreskog & Sörbom, 2013). Exclusion criteria and reaction time adjustments are the same as those used in the D-600 algorithm.

The Null Model. The null model is summarized above in equation 1. Analysis revealed a significant intercept, which is interpreted as the average reaction time across participants, $\beta = 1156.495$, $SE = 49.189$, $p < .001$, $e.s. = 0.947$. There was significant variance unexplained at each level (Level 1: $\tau = 124741.268$, $SE = 28170.312$, $p < .001$; Level 2: $\tau = 40627.352$, $SE = 11424.524$, $p < .001$; Level 3: $\tau = 502809.677$, $SE = 14034.583$, $p < .001$) so additional parameters were considered.

The Congruency Model. The congruency model is summarized in equation 2, and estimates the effects of block congruity (Level-2 predictor) on reaction time.

$$RT_{ijk} = \gamma_{000} + \gamma_{100}(congruency) + v_{00k}(congruency) + u_{0jk} + e_{ijk} \qquad (2)$$

Results of the analysis are summarized in Table 3.2. The results of the model supported the previous analyses with a significant effect of congruity where reaction times increased in the unexpected association block, $\beta = 86.182$, $SE = 43.521$, $p = .048$, $e.s. = 0.242$. The average reaction time across participants decreased slightly from the null model, $\beta = 1113.430$, $SE = 55.011$, $p < .001$, $e.s. = 0.931$.

Significant unexplained variance remained for the intercept at each level so additional parameters were considered. There was no significant unexplained variance for congruency

Table 3.2: Congruency model summary of effects

	Coefficient	Parameter	Standard Error	Z-Value	p-value	Effect Size
Fixed Effects						
	Intercept	1113.430	55.0113	20.24	< .001	0.931
	Congruency	86.182	43.521	1.980	.048	0.242
Random Effects						
Level 3	Intercept	135420.400	34002.713	3.983	< .001	-
	Congruency	-8782.486	17298.970	-0.508	0.612	-
Level 2	Intercept	36861.825	10813.959	3.409	< .001	-
Level 1	Intercept	502819.122	14034.828	35.827	< .001	-

The congruency model was a better fit for the data then the null model, $\Delta deviance = \chi^2(3) =$ 489,509.930, $p < .001$.

The Morality Model. . Given the significant order effects found in previous analyses, we did not test the congruency-order interaction in a separate model, but included them in the remaining analyses. The morality model is summarized in equation 3, and estimates the effects of a congruency-order interaction (Level-3 predictor) and moral conviction score (Level-1 predictor) on reaction time.

$$RT_{ijk} = \gamma_{000} + \gamma_{010}(congruency * order) + \gamma_{100}(morality) + v_{00k} + v_{00k}(morality) + u_{0jk} + u_{1jk}(morality) + e_{ijk} \qquad (3)$$

Results of the analysis are summarized in Table 3.3. Analysis revealed a significant congruity-order interaction, $\beta = 155.023$, $SE = 63.404$, $p = .014$, $e.s. = 0.047$. The average reaction time across participants decreased slightly from the null and congruency models, $\beta = 1096.778$, $SE = 60.424$, $p <$

.001, *e.s.* = 0.916. Moral conviction scores were not a significant predictor of reaction time, β = 5.580,

SE = 8.252, *p* = .499, *e.s.* = 0.085. Significant unexplained variance remained for the intercept at Level-

1 and Level-3. There was no significant unexplained variance for either the congruency-order interaction

or for morality.

Table 3.3: Morality model summary of effects

	Coefficient	Parameter	Standard Error	Z-Value	p-value	Effect Size
Fixed Effects						
	Intercept	1096.778	60.424	18.151	< .001	0.916
	Morality	5.580	8.25	0.676	.499	0.085
	Congruency* Order	155.023	63.404	2.445	.014	0.047
Random Effects						
Level 3	Intercept	169023.313	39899.520	4.236	< .001	-
	Morality	673.151	981.683	0.686	.493	-
Level 2	Intercept	-63.708	17245.688	-0.004	.998	-
	Morality	6042.437	3760.044	1.607	.108	-
Level 1	Intercept	503356.299	14386.118	34.989	< .001	-

Although morality was not a significant indicator, the morality model is a better fit for the data then the

null model, *Δdeviance* = χ^2(6) = 5,279,409.370, *p* < .001.

    The Attitude Model. The attitude model is summarized in equation 4, and estimates the effect of a

congruency-order interaction (Level-3 predictor) and attitude valence (Level-1 predictor) on reaction

time.

$$RT_{ijk} = \gamma_{000} + \gamma_{010}(congruency * order) + \gamma_{100}(attitude) +$$
$$v_{00k} + v_{00k}(attitude) + u_{0jk} + u_{1jk}(attitude) + e_{ijk} \qquad (4)$$

Results of the analysis are summarized in Table 3.4. Analysis revealed a significant congruity-order interaction, $\beta = 148.450$ $SE = 56.423$, $p = .009$, $e.s. = 0.051$. The average reaction time across participants decreased slightly from the null and congruency models, $\beta = 1101.954$, $SE = 52.350$, $p < .001$, $e.s. = 0.935$. Attitude valence was not a significant predictor of reaction time, $\beta = 47.641$, $SE = 33.714$, $p = .158$, $e.s. = 0.175$. Significant unexplained variance remained for the intercept at Level-1 and Level-2. There was no significant unexplained variance for either the congruency-order interaction or for attitude valence.

The attitude model was a worse fit for the data then the null model, $\Delta deviance = \chi^2(6) = -13{,}183{,}598{,}273.562$, $p > .05$.

Table 3.4: Attitude model summary of effects

	Coefficient	Parameter	Standard Error	Z-Value	p-value	Effect Size
Fixed Effects						
	Intercept	1101.954	52.350	21.050	< .001	0.936
	Attitude	47.641	33.714	1.413	.158	0.175
	Congruency* Order	148.4450	56.423	2.631	.009	0.051
Random Effects						
Level 3 Intercept		133795.408	29661.286	4.511	< .001	-
	Attitude	6038.347	16749.439	0.361	.718	-
Level 2 Intercept		15664.107	10581.099	1.480	.139	-
	Attitude	15372.508	22159.516	0.694	.488	-
Level 1 Intercept		503427.328	14517.922	34.676	< .001	-

3.3 Universality IAT

The universality IAT was constructed to measure the association between universality and morality, based on theory that suggests that people view their moral attitudes as applicable to everyone.

3.3.1 Hypothesis Testing

Hypothesis 1b

For the universality IAT, the first hypothesis was that there would be a congruity effect demonstrated by faster responses when other/moral judgments are paired and self/non-moral judgments are paired (expected association) than when other/non-moral judgments are paired and self/moral judgments are paired (unexpected association). The congruity effect was tested using the D-600 algorithm described above (also on critical trials only). D score results indicated no significant association between universality and morality, $D = 0.027$, $SD = 0.528$, 95% $CI = -0.111, 0.164$; $M_{difference} = -1$ms, $SD = 313$ms.

Because of the unexpected order effects in the objectivity IAT, separate D scores were calculated for the between subject order variable. There were no significant order effects, as illustrated in Figure 3.3 Participants who received the expected association in the first critical block followed by the unexpected association in the second critical block demonstrated no significant association between universality and morality, $D = 0.094$, $SD = 0.493$, 95% $CI = -0.097, 0286$; $M_{difference} = 39$ms, $SD = 340$ms. Participants who received the expected association in the first critical block followed by the unexpected association in the second block also demonstrated no significant association between objectivity and morality, but the effect trended in the opposite direction, $D = -0.035$, $SD = 0.559$, 95% $CI = -0.240, 0.171$; $M_{difference} = -38$ms, $SD = 288$ms.
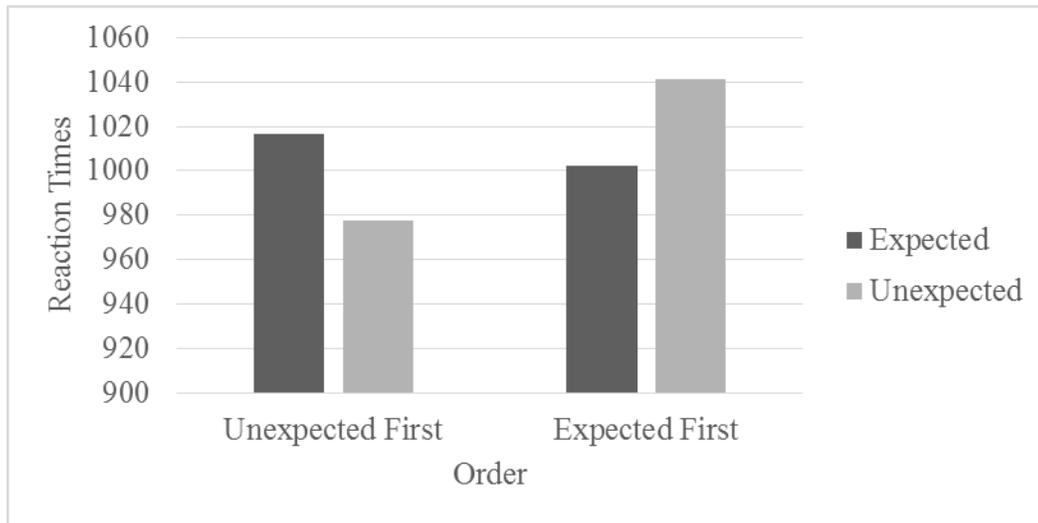
Figure 3.3: Order Effects on D Score: Universality IAT

Hypothesis 2b

The second hypothesis was that the congruity effect would be affected by the morality of the judgments, demonstrated by a significant congruity-morality interaction. Specifically, that the morality judgments would be equally associated to self and others, with similar reaction times across blocks, but that non-moral judgments would follow the typical pattern, with faster reaction times in expected association block than in the unexpected association block. Like the objectivity IAT, the interaction effects were tested using a 2x2x2 Mixed ANOVA. These analysis do not include the same trials used in the d-600 calculations. Instead, these analyses excluded the practice trials and the trials where self/other judgments were made. The same exclusion criteria and accuracy adjustments from the D-600 algorithm were applied to trials in these analyses.

There was no significant difference between the expected association and the unexpected association, $F(1,59) = 0.068$, $p = 0.795$. However, there was a significant block by condition interaction, $F(2,63) = 4.145$, $p = 0.046$. The interaction was probed using paired t-tests. There were no significant congruity effects when the unexpected association was presented first, $M_{difference} = -72ms$, $SD = 249ms$,

$t(29) = -1.579$, $p = .125$, 95% CI = -165.292, 21.275. There were also no significant effects when the expected association was presented first, $M_{difference} = 55$ms, $SD = 235$ms, $t(29) = 1.293$, $p = 0.206$, 95% CI = -32.343, 143.647. It is likely that the significant interaction was due to the difference in the direction of the effects, with a negative effect when the unexpected association was presented first, and a positive effect with the expected association was presented first.

Contrary to the hypothesis, there were no significant effects of morality. Moral stimuli ($M = 1156$ms, $SD = 345$ms) were categorized equally as fast as non-moral stimuli ($M = 1208$ms, $SD = 444$ms), $F(1,63) = 0.946$ $p = 0.335$. The predicted congruity by morality interaction was also non-significant ($F(2,63) = 0.076$, $p = 0.783$). Figure 3.4 illustrates the results of the morality-congruity interaction.
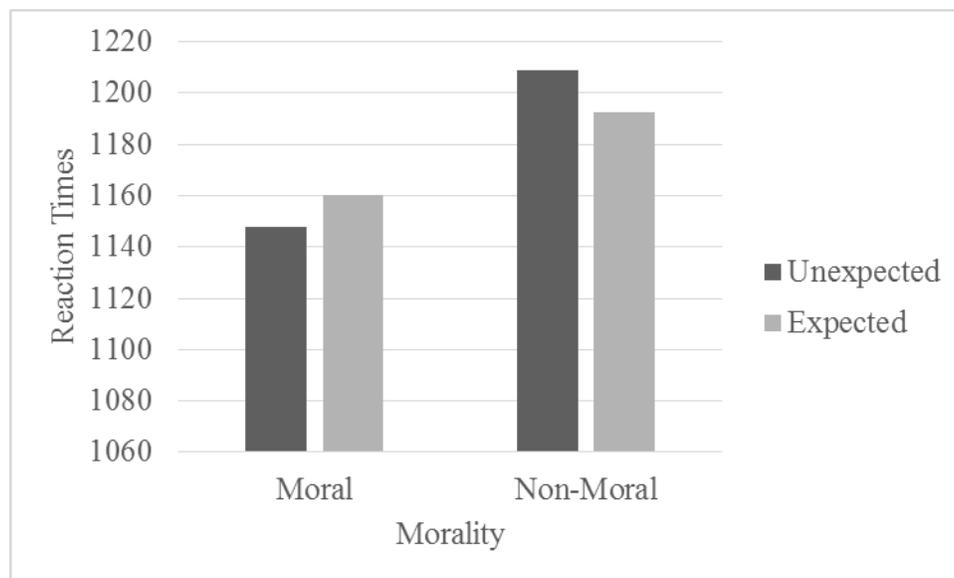
Figure 3.4: Congruity-Morality interaction: Universality IAT

3.3.2 Multilevel Modeling-B

The Null Model. All model information described above for the Objectivity IAT apply to the following model. The null model is summarized above in equation 1. Analysis revealed a significant

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intercept, which is interpreted as the average reaction time across participants, $\beta = 1186.263$, $SE = 44.336$, $p < .001$, $e.s. = 0.958$. There was significant variance unexplained at Level 1 ($\tau = 107537.771$, $SE = 22697.610$, $p < .001$) and Level 3 ($\tau = 796193.114$, $SE = 22481.881$, $p < .001$). Due to non-significant unexplained variance at Level 2, a congruency model was not conducted. The morality and attitude models conducted for the objectivity IAT were also run for the universality IAT, however, findings were non-significant. Appendix D contains tables summarizing those findings.

3.4   Additional Analyses

3.4.1   Correlations

Although morality is thought to be related to a variety of constructs, such as attitude strength, this has rarely been tested using complete measures from the attitude literature, and instead have often been examined using proxy measures (e.g., Skitka et al. 2005). Correlations among these variables were calculated and are summarized in Table 3.6.

Table 3.6: Correlations among measured variables: Experimental session

	MC	Certainty	Importance	RT
Moral Conviction (MC)	1.000			
Certainty	.126**	1.000		
Importance	.242**	.552**	1.00	
Reaction Time (RT)	.007	.000	.010	1.000

** Correlation is significant at $p \leq .01$.

Correlations were also calculated for the abbreviated scales in the pre-screen data, to encompass more data, summarized in Table 3.7.

Table 3.7: Correlations among measured variables: Pre-Screen

	MC	Strength	Valence
Moral Conviction (MC)	1.000		
Strength	.434**	1.000	
Attitude Valence	-.102	.084	1.00

** Correlation is significant at $p \leq .01$.

3.4.2   Reliabilities

All scales were shown to have more than acceptable levels of internal consistency. Reliability analyses were conducted across participants and issues. For four items, the moral conviction scale showed good reliability ($\alpha = 0.980$). For nine items, the attitude scale showed good reliability ($\alpha = 0.967$). For seven items, the attitude certainty scale showed good reliability ($\alpha = 0.908$). For three items, the attitude importance scale showed good reliability ($\alpha = 0.885$).

3.4.3   Differences between Moral and Non-Moral Attitudes

Similar to the correlations above, confirmation of the theoretical assumptions that separate moral and non-moral attitudes is possible with this data. Table 3.7 summarizes these differences between moral and non-moral attitudes. Moral attitudes ($M = 4.918$, $SD = 1.073$) were viewed as significantly more important than non-moral attitudes ($M = 4.058$, $SD = 1.383$), $M_{difference} = -0.860$, $SE = 0.205$, $t(144) = 0.-4.197$, $p < .001$. There was no significant difference in attitude certainty.

Table 3.8: Differences between moral and non-moral attitudes

	Moral		Non-Moral		Morality Difference			
	Mean	SD	Mean	SD	Mean	SE	t-value	p-value
Moral Conviction	6.233	0.579	1.832	0.6367	-4.401	0.101	-43.693	< .001
Attitude Certainty	5.681	0.758	5.464	0.935	-0.218	0.141	-1.547	0.124
Attitude Importance	4.918	1.073	4.058	1.383	-0.860	0.205	-4.197	< .001

Additionally, there were similar number of positive and negative attitudes for non-moral attitudes (positive k = 35 and negative k = 37) but not for moral attitudes (positive k =28 and negative k = 44). This difference is illustrated in Figure 3.5.
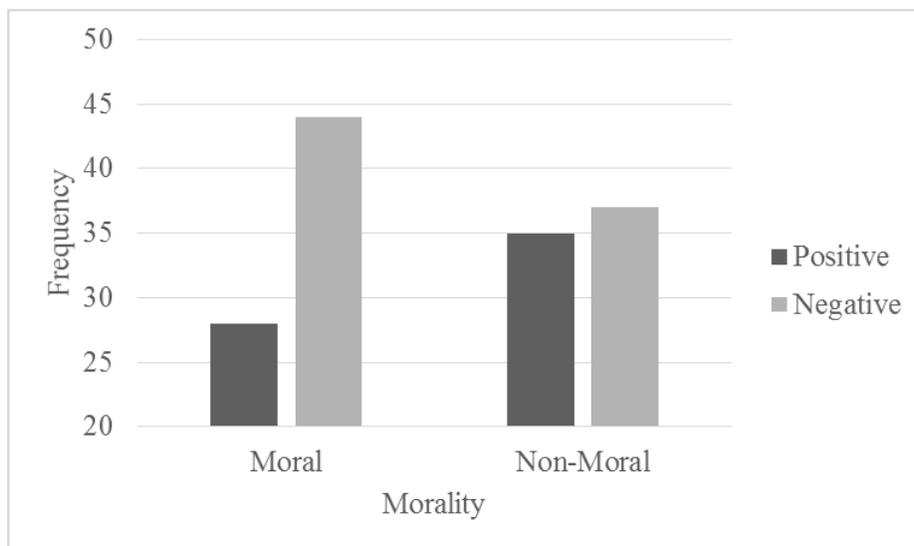
Figure 3.5: Attitude by Morality

3.4.4 Confirmation of "Random" Assignment

Because there were significant order effects for the objectivity IAT, comparisons were made across order assignment on the measured variables and the demographic information to rule out any unseen

effects, and confirm the assumptions that random assignment was successfully approximated. Table 3.8 summarizes the differences between participants assigned to condition 1 and condition 2. With no significant effects, "Random assignment" is confirmed.

Table 3.9: Variable differences across conditions.

	Condition 1		Condition 2		Conditional Difference			
	Mean	SD	Mean	SD	Mean	SE	t-value	p-value
Moral Conviction	4.082	2.323	3.978	2.419	0.104	0.381	0.273	.785
Attitude Valence	-.216	1.939	-.214	2.090	0.194	0.166	1.173	.243
Attitude Certainty	5.523	1.215	5.626	1.142	-0.103	0.142	-0.728	.468
Attitude Importance	4.490	1.729	4.486	1.711	0.004	0.217	0.019	.985
Gender	0.29	0.460	0.31	0.471	-0.025	0.109	0.228	.821
Age	21.53	6.514	19.39	3.082	2.134	1.211	1.762	.084
Political Affiliation	3.76	1.261	3.23	1.262	0.535	0.296	1.808	.075

Chapter 4: Discussion

In the current study, two hypotheses were examined. In this discussion, each hypothesis will be discussed separately, followed by a discussion about the additional findings from the exploratory analysis, and will end with a general discussion.

4.1 Hypothesis One: Congruity Effect

Previous research has theorized and loosely demonstrated that moral attitudes are viewed as more factual and more universal than non-moral attitudes (for review, see Skitka, 2010). Based on these theories, the current study aimed to measure the association between morality and objectivity (i.e., my belief is a fact) and between morality and universality (i.e., my belief applies to everyone), using the IAT.

The first hypothesis was that there would be a congruity effect demonstrated by faster reaction times to the expected associations than to the unexpected associations. In the objectivity IAT, the expected association was characterized by fact/moral and opinion/non moral pairings, and the unexpected association was characterized by fact/non-moral and opinion-moral pairings. The D-600 algorithm was used to calculate an IAT effect. The hypothesis was partially supported for the objectivity IAT. There was a significant congruity effect, however additional analysis revealed significant block order effects. The hypothesis was not supported for the universality IAT.

Broadly, the significant effects found for the objectivity IAT and non-significant effects for the universality IAT suggests that either 1) objectivity is a more important characteristic of moral attitudes than universality or 2) universality was not appropriately captured or conceptualized in the IAT. Currently, neither option can be completely ruled out, due to a lack of research about the relationships of objectivity and universality to morality. To date, objectivity and universality have to yet to be explored much beyond the initial studies linking them to morality. For instance, objectivity has been thought to be related to morality based on a study conducted by Haidt and colleagues (1993). In the study, when asked to justify their moral beliefs, many participants replied with comments such as "it's just wrong", indicating that they

believed their moral belief to be objectively wrong. Similarly, universality has been theoretically linked to morality in a recent review (Skitka, 2010), based on evidence from an anthropological study (Dorkeno,1994 as cited in Skitka, 2010) however, universality has yet to be tied to morality in psychological research. Without a body of literature on which to make claims about the findings in this study, it is unclear whether objectivity is more important or whether the universality IAT was a poor measure of the construct.

One explanation for the current conceptualization of the universality IAT is that positive and negative attitudes may be differentially related to self and other, such that participants may be more likely to associate positive moral attitudes to self and negative moral attitudes to others. Previous research demonstrates a self-positivity bias such that people judge themselves more positively than others (Pahl & Eiser, 2005). In the current study, issue selection attempted to pick both negative and positive attitudes, which may have resulted in self-positivity bias and thus clouded the associations between morality and universality. An informal examination of the possibility of this bias in the current study was conducted. Reaction times were compared across blocks for participants who had nearly all negative or all positive issues (N = 16), and a self-positivity trend was found. Overall, positive attitudes were responded to faster when the issue (moral or non-moral) was paired with self, than when paired with other. Similarly, negative attitudes were responded to when the issue was paired with other, than when paired with self. Of course, while these informal analyses are not enough to confirm any true self-positivity effects present in the current study, the trends support that it could have been a factor.

In order to make any claims about the results of the current study, more research is needed. Specifically, a replication of the results of the objectivity IAT and a re-conceptualization of the universality IAT are necessary. Future research examining these relationships using implicit measures, should consider other paradigms that may be more appropriate such as sequential priming tasks, or other versions of the IAT such as the single –attribute IAT which was developed to measure constructs that do

not have a natural counterpart, like universality. Given the extent of the literature, future research should also study implicit and explicit measures of objectivity and universality simultaneously.

The more specific implication of the results related to the IAT itself is that there were significant order effects. For the objectivity IAT, there were significant order effects such that only participants who received the unexpected associations first demonstrated the effect, however the effect in the other order condition displayed an effect in the expected direction, Previous research has shown that some common IATs, such as the Gender-Science IAT, and the Age IAT have relatively large order effects (Greenwald et al., 2003). The order effects in previous research however differ from those in the current research, where the direction of the order effects are reversed. In previous research, the order effects occur when the expected association is presented first and is attributed to negative transfer, where practice at one task interferes with the ability to perform a similar task with different responses. Negative transfer in previous research resulted in the appearance of stronger expected associations and can be minimized with the inclusion of more practice trials in the later blocks. If the order effects in the current study were the result of negative transfer, we would expect to see a stronger effect when the expected association is presented first, not when it is presented second, and because there were more practice trials in the later blocks, the effect should have been diminished. Instead, for the objectivity IAT, the order effects are reversed, with stronger effects when the unexpected association is presented first.

4.2 Hypothesis Two: Congruity-Morality Interaction

The second hypothesis was that the congruity effect would be affected by the morality of the judgments, demonstrated by a significant congruity-morality interaction. This hypothesis was unsupported for either IAT. For the universality IAT, the hypothesis predicted that the interaction would reveal a different pattern of results for moral and non-moral attitudes. Specifically, that moral attitudes would be equally related to self and others (i.e., apply to everyone) and that non-moral attitudes would display a significant congruity effect (associated more to self than to others). As mentioned above, the universality

IAT used in the current study may have not captured the construct appropriately, so such an interaction could not be detected.

For the objectivity IAT, the hypothesis was that there would be a stronger congruity effect for the moral stimuli than for the non-moral stimuli based on the relationship between attitude strength and moral attitudes. Previous research in the attitude literature has demonstrated that attitude strength can be measured with response latency (for review, see Fazio, 1999). In this literature, stronger attitudes are attitude that are more easily accessible, and thus responded to more quickly. In both previous research (for review see Skitka, 2010) and the current study, moral attitudes have been shown to be associated with other measures of attitude strength. In the current study, moral attitudes were reported to be significantly more important than non-moral attitudes. This provides evidence that they might also be more accessible, and thus should have resulted in, at the least a main effect of morality, and potentially, as hypothesized, a congruity by morality effect.

While the current study partially supported the rationale for the hypothesis (e.g., correlations between attitude strength and moral conviction), there was no significant interaction between morality and congruity. This may be due to a few things. First and foremost, greater attitude importance does not necessarily mean greater attitude accessibility. Krosnick and colleagues (1993) examined the relationship among the attitude strength dimensions and found only a moderate relationship between response latency (i.e., reaction times) and other measures of attitude accessibility (e.g., how often the attitude object is thought about, $r = .49$) and weaker relationships between response latency and other attitude dimensions. A second explanation may be that any accessibility differences between moral and non-moral attitudes measured with response latencies would not be measurable in an IAT, where task complexity might hide any existing differences. To examine attitude accessibility, it might be necessary to use a simpler reaction time task or to use a different measure of accessibility.

4.3 Exploratory Analysis

The exploratory analyses provided important information for future research and application. Previous research linking the measure of moral conviction and dimensions of attitude strength was supported (Skitka, 2010 for review). Moral conviction was significantly correlated to measures of attitude strength (certainty and importance), however the current research shows smaller correlations than in previous research. This difference is likely because of the use of more complete measures in this research compared to those used in previous research. This suggests that morality and attitude strength are not as closely related as previously thought and that morality researchers interested in attitude strength measures should include the complete measures.

An interesting difference between moral and non-moral attitudes found during exploratory analyses in the current study is that there were many more negative moral attitudes than positive moral attitudes (the same trend was evident in the pre-screen data). This difference was not found for non-moral attitudes where there were nearly equal positive and negative attitudes. This suggests that moral conviction for a particular attitude may be stronger for attitude objects that we oppose compared to attitude objects we support, however further evidence is needed to examine this idea. Recent research might provide potential implications for this difference in studying morality with an IAT. Anselmi, Vianello, and Robusto (2011) found that positive words increase the IAT effect and negative words decrease the IAT effect. While the morality stimuli used in the current IATs were not explicitly positive or negative, participants rated their attitudes prior to the IATs which would make their positive or negative attitudes salient. Because the moral attitudes were more negative, it is possible that this negativity transferred to the stimuli themselves, resulting in smaller IAT effects. While it is unclear whether such a transfer effect is possible, it is something that should be considered in future research and, if possible, examined. This idea is lent some support within the current study where a significant valence-reaction time correlation

was found, such that positive attitudes were responded to faster than negative attitudes, which could ultimately have an impact on the IAT effect.

The use of multi-level modeling did not provide the insight into the association of moral attitudes to universality or objectivity that were hoped for. While the models confirmed findings for congruity and order effects, there were no significant predictors beyond that. For instance, morality and attitude did not predict reaction times, although the inclusion of morality in the model did improve overall model fit for the objectivity IAT. Additional analyses of level 3 (participant) predictors were not reported here, but were also non-significant. The use of this technique in the current study was exploratory in nature so complex models including interactions such as morality*attitude were not conducted, however such models might provide additional insights. It may also be useful in the future to consider other analytical techniques such as Structural Equation Modeling to parse out the effects of attitude valance, morality, and attitude strength, on the associations between morality and objectivity, and morality and universality.

4.4 General Discussion

One of the most impactful findings of the current study is that the IAT can be used with complex stimuli. In the objectivity IAT, the fact/opinion stimuli were short statements that took participants longer to read than the traditionally shorter one word or picture stimuli, leading to longer reaction times and greater variability. Not only did the fact/opinion stimuli take longer to read, it is likely that the stimuli were harder to process, because the evaluations of the stimuli are not as practiced as the evaluations in more traditional IATs (e.g., good-bad, male-female). The same is likely to be true for the moral/non-moral stimuli. Although, these attitudes can be described as such, it is unlikely that people automatically think about their attitudes along a morality dimension. With these complexities, that we found significant results with large effect sizes, suggests that the strength of the association between objectivity and morality is particularly strong, perhaps even more so than estimated by the current study. Unfortunately, the universality IAT was not as successful as the objectivity IAT, however this evidence is far from conclusive.

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Also of note is the variation of order effects. The IAT is a widely used measure that demonstrates robust findings (Greenwald, Pehlman, Uhlmann & Banaji, 2009) but it is not without its flaws. One of the primary criticisms of the IAT is whether the expected automatic associations (e.g., objectivity and morality) are what is actually being measured (Gawronski et al., 2011). For instance, because participants switch keys for one set of judgments during the second critical block, responses are the results of automatic associations as well as explicit executive control processes where participants have to overcome the previous response to select the correct response. This can result in the obvious order effects, however it is impossible to know to what extent these underlying processes affect responses. Also of concern, are findings that suggest that IAT effects can be controlled or situationally manipulated (De Houwer, Teige-Mocigemba, Spruyt, & Moors, 2009). While it is perhaps more difficult to know the hypothesized association in the current study compared to studies examining stereotypes, those findings make it difficult to understand the true underlying processes measured by an IAT, and the extent to which those associations are automatic. These criticisms suggest that it is particularly important to examine objectivity and universality using other implicit measures for which the underlying processes are better understood.

For the future of morality research, it is also important to consider the pre-screen process used in the current study. During the pre-screen process, 350 participants completed the survey, of which only 122 participants were eligible to complete the experimental session. Although this suggests that most people view these issues moderately (it is important to note that there was an intentional attempt to get a number of moral issues), an informal examination of the extent to which participants rated issues as moral or non-moral was conducted. Approximately one-third of participants rated more than half of the issues as moral whereas only about ten percent of participants rated more than half of the issues as non-moral. These numbers have several implications for our approach to studying moral attitudes. First, most participants imbue social issues with a moderate amount of moral conviction. Second, a subset of the population seems to be moralizers—they place moral emphasis on a larger number of issues (in this study, more than half of the issues). Third, there is also a subset of the population that seems to be non-moralizers—they place little to no moral emphasis on a large number of issues. This group is especially important given the much smaller extent to which this appears to occur. Future research should be

conducted on moralizers and non-moralizers to determine personality factors that predict the extent to which a person moralizers, and whether moralizers are more likely than others to conform to our ideas about the nature of morality (e.g., more likely to show universality and objectiveness associations). Findings from this future research may be particularly informative for participant selection or pre-screening in future research about morality.

4.4.1 Conclusions

The current study should be considered an initial exploration of morality and its underlying cognitive characteristics. The IAT has shown to be a useful tool in understanding some of the differences between morality and objectivity, but further research is necessary. Of particular interest for future research is the use of other implicit measures to more fully understand the associations between morality and objectivity, as well as to more precisely measure associations between morality and universality. Future research should also consider the extent to which people imbue issues with moral emphasis.

The findings of the current study support Skitka's theory that there are distinctions between moral and non-moral attitudes, particularly that moral attitudes are more associated with objectiveness than similar non-moral attitudes. While there was not support for an association between morality and universality, there is some indication that there may be a difference in universality depending on the valence of the attitude.

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Appendix A

Measures

Moral Conviction:

To what extent is your position on [issue]

1. ...a reflection of your core moral beliefs and convictions?

 (not at all)   1   2   3   4   5   6   7   *(extremely)*

2. ...connected to your beliefs about fundamental right and wrong?

 (not at all)   1   2   3   4   5   6   7   *(extremely)*

3. ...based on moral principle?

 (not at all)   1   2   3   4   5   6   7   *(extremely)*

4. ...a moral stance?
 (not at all)   1   2   3   4   5   6   7   *(extremely)*

Attitude**:**

 To what extent do the following judgments best describe your opinions about [attitude object]

*1.	(Negative)	-3	-2	-1	*0* *(neither)*	1	2	3 (Positive)
*2.	(Dislike)	-3	-2	-1	*0* *(neither)*	1	2	3 (Like)
*3.	(Bad)	-3	-2	-1	*0* *(neither)*	1	2	3 (Good)

 To what extent do the following judgments best describe your emotions about [attitude object]

4.	(Sorrow)	-3	-2	-1	*0* *(neither)*	1	2	3 (Joy)
5.	(Angry)	-3	-2	-1	*0* *(neither)*	1	2	3 (Relaxed)
6.	(Disgusted)	-3	-2	-1	*0* *(neither)*	1	2	3 (Acceptance)

 To what extent do the following judgments best describe your thoughts about [attitude object]

7.	(Harmful)	-3	-2	-1	*0* *(neither)*	1	2	3 (Beneficial)
8.	(Unwise)	-3	-2	-1	*0* *(neither)*	1	2	3 (Wise)

9.   (Unhealthy)   -3   -2   -1   *0*   1   2   3   (Wholesome)
                                (neither)

*Items used during pre-screen only. Other items used during experimental session only.

Attitude Certainty:

1. How certain are you that you know what your true attitude toward [issue] really is?

(not at all)   1   2   3   4   5   6   7 *(extremely)*

2. To what extent is your true attitude toward [issue] clear in your mind?

(not at all)   1   2   3   4   5   6   7 *(extremely)*

3. How certain are you that the attitude you just expressed toward [issue] is really the attitude you have?

(not at all)   1   2   3   4   5   6   7 *(extremely)*

4. How certain are you that the attitude you expressed toward [issue] really reflects your true thoughts and feelings?

(not at all)   1   2   3   4   5   6   7 *(extremely)*

5. How certain are you that your attitude toward [issue] is the correct attitude to have?

(not at all)   1   2   3   4   5   6   7 *(extremely)*

6. To what extent do you think that other people should have the same attitude as you about [issue]?

(not at all)   1   2   3   4   5   6   7 *(extremely)*

7. How certain are you that of all possible attitudes one might have about [issue], your attitude reflects the right way to think and feel about the issue?

(not at all)   1   2   3   4   5   6   7 *(extremely)*

Attitude Importance:

1. How important is the issue of [issue] to you personally?

(not at all)   1   2   3   4   5   6   7   (*extremely)*

2. How much does the issue of [issue] mean to you?

(not at all)   1   2   3   4   5   6   7   (*extremely)*

3. How important is the issue of [issue] compared to other public issues?

(not at all)   1   2   3   4   5   6   7   (*extremely)*

Appendix B

Demographics Form

Gender: Male   Female   **Age:** _____

Ethnicity:
 African American   Asian
 Caucasian   Hispanic
 Native American   Other: _____

Citizenship: USA   Mexico   Other: _____

Political Affiliation

1	2	3	4	5	6	7
Extremely Liberal	Liberal	Somewhat Liberal	Neither	Somewhat Conservative	Conservative	Extremely Conservative

Religious Affiliation

 Atheist   Buddhist/Hindu
 Catholic   Christian
 Jewish   Muslim
 Other: _____ or None

Appendix C

IAT Stimuli

Facts	Opinions	Self	Others
Obama is President	Art is fun	Me	Group
Earth is round	Math is hard	Individual	Others
Texas is a state	Reading is easy	I	People
$2 + 2 = 4$	Apples taste good	Myself	They
Snow is white	Rap is bad	Mine	Their
Water is wet	Lemons taste bad	Personal	Them
Mars is red	History is boring	Self	Society
Equator is south	Rain is nice		Social

Moral or Non-moral Issues
Abortion
Gay Marriage
Torture
Animal Research
Cheating
Incest
Death Penalty
Euthanasia
Illegal Drugs
Eating Pets
Gun Control
Tattoos
Recycling
Drones
Stem Cell Research
Pre-Marital Sex
Wiki-Leaks
Speeding

Appendix D

Results of Paired t-tests for Non-adjusted RTs

Objectivity IAT: Block effects

	$M_{difference}$	SD	T-value	p-value	Cohen's d
Non-Adjusted RTs	107	288	3.029	.004	0.372
Adjusted RTs	101	298	2.739	.008	0.330

Reaction times are reported in MS.

Universality IAT: Block effects

	$M_{difference}$	SD	T-value	p-value	Cohen's d
Non-Adjusted RTs	35	322	0.847	.401	0.108
Adjusted RTs	-6	313	-0.156	.877	0.020

Reaction times are reported in MS.

Appendix E

Results for Multi-Level Models- Universality IAT

Universality IAT: Morality Model

	Coefficient	Parameter	Standard Error	Z-Value	p-value	Effect Size
Fixed Effects						
	Intercept	1219.700	65.047	18.751	< .001	0.921
	Morality	-11.355	9.034	-1.257	.209	0.156
	Congruency* Order	14.673	23.458	0.626	.532	0.012
Random Effects						
Level 3	Intercept	174131.443	46442.730	3.749	< .001	-
	Morality	1398.973	1103.613	1.268	.205	-
Level 2	Intercept	-1351.686	25957.198	-0.052	.958	-
	Morality	78.213	1249.162	0.063	.950	-
Level 1	Intercept	787362.988	22741.168	34.623	< .001	-

Universality IAT: Attitude Model

	Coefficient	Parameter	Standard Error	Z-Value	p-value	Effect Size
Fixed Effects						
	Intercept	1188.49281	51.378	23.132	< .001	0.946
	Attitude	-22.168	55.300	-0.401	.689	.050
	Congruency* Order	15.926	22.346	0.713	.476	.014
Random Effects						
Level 3	Intercept	111470.468	27412.068	4.06	< .001	-
	Attitude	94759.726	37769.556	2.509	.012	-
Level 2	Intercept	-4256.388	12460.166	-0.342	.733	-
	Attitude	-6463.920	17151.782	-0.377	.706	-
Level 1	Intercept	778317.868	22667.181	34.337	< .001	-

Appendix F

Morality of Issues

	Non-Moral		Moral	
	Total	Percentage	Total	Percentage
Abortion	53	17%	147	47%
Gay Marriage	117	37%	104	33%
Torture	73	23%	184	59%
Animal Research	80	26%	110	35%
Cheating	53	17%	191	61%
Incest	69	22%	195	62%
Death Penalty	53	17%	151	48%
Illegal Drugs	72	23%	139	44%
Gun Control	88	28%	120	38%
Tattoos	140	45%	86	27%
Recycling	54	17%	183	58%
Drones	102	33%	60	19%
Stem Cell	88	28%	106	34%
Euthanasia	68	22%	139	44%
Pre-Marital Sex	99	32%	129	41%
Wiki Leaks	91	29%	109	33%
Speeding	123	39%	94	30%

Attitude Valence of Issues

	Positive		Negative		Neutral	
	Total	Percentage	Total	Percentage	Total	Percentage
Abortion	52	48%	193	61%	69	22%
Gay Marriage	182	58%	71	23%	61	19%
Torture	0	0	269	86%	0	0
Animal Research	62	20%	172	55%	80	26%
Cheating	0	0	268	85%	0	0
Incest	0	0	268	85%	0	0
Death Penalty	102	33%	131	42%	81	26%
Illegal Drugs	31	10%	222	71%	61	19%
Gun Control	115	37%	124	68%	75	24%
Tattoos	185	59%	52	17%	77	24%
Recycling	294	94%	0	0	0	0
Drones	65	21%	101	32%	148	41%
Stem Cell	186	59%	23	7%	105	33%
Euthanasia	78	25%	136	43%	100	32%
Pre-Marital Sex	127	40%	89	28%	98	31%
Wiki Leaks	67	19%	139	44%	108	34%
Speeding	55	17%	185	59%	74	24%

Vita

Ciara K. Kidder (née Connally) was born on June 20, 1989. The youngest child of Kelly and Brita Connally, she graduated from A.C. Davis High School in Yakima, Washington, in 2007. Ciara received her Bachelor of Science in Psychology from Lock Haven University of Pennsylvania in 2010, graduating Magna Cum Laude from the University, and with Distinction from the Global Honors Program. In 2011, she was accepted into the Social Cognitive Neuroscience Doctoral program at the University of Texas at El Paso (UTEP) under the supervision of Dr. Stephen L. Crites, where she has worked as a Teaching Assistant and as an Assistant Instructor. During the course of her studies, she has presented her work at professional conferences on two occasions. Ciara will continue studying at UTEP, under the supervision of Dr. Crites, in pursuit of her Ph.D. Her research primarily focus on the study of moral attitudes and the measurement of stereotypes.

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