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Reaching New Heights: An Examination of Cognitive Dissonance and the Attitude Toward Height and Leadership

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Reaching New Heights:
An Examination of Cognitive Dissonance and the Attitude Toward Height and Leadership

Senior Project submitted to
The Division of Social Studies
of Bard College

by
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Annandale-on-Hudson, New York

April 2014

DEDICATION

I dedicate this project to my parents, Evelyn and Alan Harris. With your love and support, I am able to accomplish all of my goals.

I also dedicate this project to all the “Power Houses” out there, who just happen to also be petite.

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I want to thank all the people who have helped me throughout this process and without whose support, I would not have been successful.

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ABSTRACT

Cognitive dissonance is the theory that when someone holds two conflicting cognitions they will feel internal discomfort and will be motivated to reduce this discomfort. They reduce the discomfort by changing one of the cognitions, either by intensifying the original cognition or by diminishing the original cognition, making the new cognition the dominant cognition. The present experiment examines the role that cognitive dissonance plays in intensifying or diminishing prejudices within the attitude domain of the association between height and leadership. I attempted to induce dissonance by showing 20 Bard College students the discrepancy between their explicit and implicit attitudes about the connection of height and leadership. I measured the magnitude of dissonance produced after they viewed a discrepancy score, using skin conductance response equipment and a self-assessment of dissonance scale. Ten subjects then received an educational intervention describing fifteen world leaders whose heights were below average, which was predicted to diminish implicit prejudices. Subjects' implicit attitudes were then measured again to determine if there had been a change in attitude. I expected that dissonance would be created when subjects viewed their discrepancy score and that the educational intervention would then further diminish implicit prejudices. The results showed that dissonance was created when subjects viewed their discrepancy score, but that the educational intervention did not significantly diminish the dissonance. The dissonance assessed by the self-assessment scale, however, was connected to the diminishment of implicit attitudes. These results show that cognitive dissonance can lead to the diminishment of implicit prejudices.

CHAPTER ONE: INTRODUCTION

Cognitive Dissonance: Methods for Creating Cognitive Dissonance, Measuring Cognitive Dissonance, Cognitive Dissonance and Prejudice; The Attitude Domain of the Association between Height and Leadership; Articles Explored in Literature Review; Summary of Methods and Procedure: Session One: Measurement of Explicit Attitudes, Session Two: Measurement of Implicit Attitudes, Session Three: Measurement and Reduction of Cognitive Dissonance; Expected Results

Cognitive Dissonance:

The *Theory of Cognitive Dissonance* as developed by Leon Festinger during the 1950s, is the understanding that when a person has two inconsistent or dissonant cognitions, this will create internal discomfort or cognitive dissonance. Festinger (1957) presents cognitive dissonance as a motivator, explaining that, “*The presence of dissonance gives rise to pressures to reduce or eliminate dissonance. The strength of the pressures to reduce the dissonance is a function of the magnitude of the dissonance*” (p. 18). The focus of this study is to understand the effect that this pressure to reduce dissonance has on the change in attitudes, specifically while looking at the intensification and diminishment of prejudices.

We can understand the effect that dissonance can have on the intensification or diminishment of attitudes, by measuring the magnitude of the dissonance that is created. As Festinger (1957) explains, “*The magnitude of the dissonance (or consonance) increases as the importance or value of the elements increase*” (p. 18). If the attitude elements are important, there will be more pressure to reduce the dissonance. As our attitudes are often valued because they help define who we are and how we see ourselves, having conflicting attitudes creates a large magnitude of dissonance.

Methods for Creating Cognitive Dissonance. In my experiment, I focus on this value for attitudes to create dissonance within my subjects. By exposing subjects to their own conflicting explicit

(attitudes people are aware they hold) and implicit (attitudes people are unaware they hold) attitudes, both attitudes on which they should place some level of importance as the attitudes are their own, I will be able to create a large magnitude of dissonance, creating a strong pressure to reduce the dissonance and change the attitudes. I argue that the exposure to conflicting attitudes is likely to create higher magnitudes of dissonance than a counter-attitudinal essay, for instance. This I explicate below.

In experiments that use counter-attitudinal essays to create and examine cognitive dissonance, subjects are divided into low-choice and high-choice conditions. The low-choice condition asks subjects to complete the required task and is understood to create little dissonance because subjects feel obligated to write an essay about an attitude with which they disagree, meaning there is not likely to be an internal debate when deciding to complete the task because they do not have this choice. The high-choice condition asks subjects to complete the task, but also reminds the subjects that this task is voluntary and they are not obligated to complete the task. It is thought that this condition creates more dissonance because when subjects are aware that they are making the choice to argue a perspective that contradicts their original attitude they cannot excuse their actions as just “following instructions,” instead they have to confront the reality that they actively chose to contradict their original attitude. Although counter-attitudinal essays are often used to create dissonance, I will explain why they are not the most effective way of creating dissonance.

When subjects agree to participate in experiments, there is a certain amount of pressure or obligation they feel to complete and abide by the rules of the experiment. This can partly be observed in Stanley Milgram’ obedience studies, where many subjects felt obligated to complete

the experiment because they had agreed and begun to participate, on the basis that they were contributing to important scientific research, regardless of the task they were asked to do. When subjects are asked to write a counter-attitudinal essay, even when given the choice to opt out, they complete it because they were asked and to be helpful to the experimenter, rather than because they want to write the essay. Even when subjects are under the impression that their essay might be used to create a new rule or decision about the topic with which they disagree, the subjects are able to retain the knowledge that they disagree with the topic. This means that subjects can separate themselves from what they are writing and not feel an internal conflict about writing this argument, which would not create great amounts of dissonance. If subjects were not able to compartmentalize what and why they are writing, I would expect that they would at least attempt to leave the experiment, because the dissonance would be too great to continue the process of writing the essay. As subjects do not usually attempt to leave when writing a counter-attitudinal essay, it can be inferred that the dissonance created by writing counter-attitudinal essays is not a significantly high magnitude of dissonance.

We now turn to the methodology of the present study. When subjects are exposed to a discrepancy between their explicit and implicit attitudes, they are forced to reconcile why their firmly held explicit attitude (a belief they were aware they hold), which will be represented by the Likert scaling procedure, conflicts with their implicit attitude (a belief that they might have been unaware they hold), but one that has been proven to be their own through the Implicit Association Test. To construct a model where subjects' explicit attitude will be likely to differ from their implicit attitude, it is necessary to first assess subjects' level of social desirability. Marlowe and Crowne (1960), the creators of the Marlowe-Crowne Social Desirability Scale,

define social desirability as “the need of [subjects] to obtain approval by responding in a culturally appropriate and acceptable manner” (p. 353). Social desirability can be described as a personality trait that influences the way that people make deliberate decisions. The need to be socially desirable plays a role in a person’s explicit attitudes. Someone who has the personality trait of being highly socially desirable should have explicit attitudes that correlate with what they believe are socially desirable attitudes. Since being socially desirable is a personality trait, it is unlikely that a characteristically socially desirable person’s explicit attitudes will align with their implicit attitudes, which are based on automatic evaluations or instinctual beliefs. For my experiment I will assess the relationship between levels of social desirability and explicit attitudes. I presume that subjects with high levels of social desirability and an extreme explicit attitude will likely hold inconsistent explicit and implicit attitudes about height and leadership.

I propose that exposure to one’s own conflicting attitudes creates greater magnitudes of dissonance than a counter-attitudinal essay. When writing a counter-attitudinal essay, regardless of the understanding that the essay may prompt a decision with which one disagrees, it is always possible to assert that one is still strongly against the decision that was supported in the essay, thus only creating a moderate magnitude of dissonance. However, when confronted with the inconsistencies of one’s own attitudes, it is difficult to ignore this internal conflict of values, creating a high magnitude of dissonance. As explained earlier, the magnitude of dissonance created is connected to the pressure to reduce the dissonance. I expect that the pressure to reduce the dissonance will result in an intensification or diminishment of the implicit attitude held by the subject. It is necessary to assess the magnitude of dissonance created to understand exactly how much dissonance is needed to create attitude change, as well as to compare the level of

dissonance created to the level to which the dissonance has been reduced to understand how the reduction of dissonance plays a role in changing the attitude.

Measuring Cognitive Dissonance. While Festinger studied cognitive dissonance, he was only able to study dissonance through self-reports or by observing the changes in attitude and behavior of the subjects. Festinger attempted to control for the magnitude of dissonance created, but through these measurements he could never definitively measure how much dissonance was created, he could only infer that the behavior he observed was a result of the creation of dissonance. By 1964 Festinger left the world of Social Psychology, frustrated by his inability to empirically measure cognitive dissonance. Oshikawa (1972) effectively describes how self-reports can be inconclusive and inaccurate measures of cognitive dissonance. Oshikawa first explains that there is an incentive to measure dissonance directly because, “The researcher could also examine the relationship between aroused dissonance and the strength of dissonance reduction attempts. This would permit him to test a basic assumption of dissonance theory; namely, the greater the dissonance, the stronger the dissonance reduction attempts” (p. 64). Oshikawa goes on to examine an experiment performed by Gerald D. Bell where Bell attempted to examine the dissonance produced by asking “recent purchasers of automobiles how uneasy they felt about the purchase decision, to what extent they wondered if they had made the right decision, and whether they thought they had received the same kind of deal that other purchasers had received” (p. 65).¹ Bell’s research exhibited results that did not fit into the framework of cognitive dissonance. Rather than observing that subjects with high levels of dissonance were convincing themselves that the purchase was the right decision, as would be the expected method

¹ Gerald D. Bell (1967), “The Automobile Buyer After the Purchase,” *Journal of Marketing*, 31, 12-16.

to reduce dissonance, his assessment of “high-dissonance” subjects showed that subjects were not happy with their purchase or the service they had received. After conducting an experiment to understand the discrepancy in Bell’s study, Oshikawa explains that Bell’s self-report measurement measured chronic-anxiety rather than dissonance, as the reaction Bell discovered more clearly aligned with characteristics of chronic-anxiety than dissonance reduction. Oshikawa directly shows the problems that arise when relying on self-report to measure the dissonance created, namely that self-reporting can lead to a misrepresentation of dissonance or even assess a different psychological state.

Just as Festinger hoped to discover a better way than self-reports to test the presence and magnitude of cognitive dissonance created, I too wanted to ensure that the dissonance I create can be empirically measured and will represent the exact magnitude of dissonance created. As cognitive dissonance is the creation of an internal discomfort produced by conflicting cognitions, I wanted to understand how this internal discomfort may be assessed through a psychophysiological reaction. Initially, I looked toward studies that used fMRIs to measure cognitive dissonance as fMRIs can show which brain regions are activated during the creation of cognitive dissonance. Kitayama, Chua, Tompson, and Han (2013) used an fMRI to assess dissonance and discovered, among other neurological activation, that the anterior insula was activated when dissonance was created. I was curious about the role that the anterior insula played in dissonance creation, as it plays a role in the autonomic nervous system’s physiological response to stress.

Knowing that I would not have access to an fMRI, I hoped that I could discover a physiological measurement, that could assess the levels of negative arousal or stress associated

with dissonance creation and eventual reduction. I discovered two studies which explored the physiological response to dissonance using skin conductance response equipment. These studies performed by Croyle & Joel Cooper (1983) and Elkin & Leippe (1986) measured cognitive dissonance by assessing skin conductance response while subjects performed counter-attitudinal essays. These studies showed a significant level of negative arousal within the high-dissonance conditions of the experiments, which these researchers attribute to the creation of cognitive dissonance. Although the arousal recorded in these experiments is not clearly dissonance, the skin conductance equipment still has the potential to measure cognitive dissonance. I will expand on this understanding in Chapter Two. By using the skin conductance response equipment, I have the opportunity to observe the level of dissonance created and the level at which it is reduced to create attitude change. For my experiment, this equipment will be able to assess the magnitude of dissonance created when subjects are presented with their conflicting attitudes, determining whether this procedure is a good method to create dissonance.

Cognitive Dissonance and Prejudice. My experiment is focused on the connection between cognitive dissonance and prejudice. Through this experiment I will explore the role that cognitive dissonance plays in attitude change, as detailed above, to understand how prejudices are intensified and diminished after the creation of cognitive dissonance. As prejudices arise, we wonder what causes them to flourish and how they can be reduced. Prejudice is defined by the Merriam-Webster Dictionary as “a feeling of like or dislike for someone or something especially when it is not reasonable or logical.” Prejudices are often a human construct based on evolutionary or historical reasoning, which are reinforced through social behavior and become

ingrained in societies through cultural acceptance, making prejudices the norm and leading to internalized prejudices toward an oppressed group.

As cognitive dissonance examines the internal inconsistencies of human thought, I would like to understand how inconsistent views about a group of people and their abilities may affect prejudices. Many people hold implicit attitudes that differ from their explicit attitudes, indicating that attitudes that they are unaware they hold are inconsistent with their perception of the attitudes that they are aware they hold. For example, a White person could think that they do not have any prejudices toward Black people because they are not aware of ever thinking or acting prejudicially against Black people. However, this White person could be unaware of an implicit attitude where they believe that Black people are inferior to White people. This implicit prejudice may or may not lead to an obvious discriminatory act, but it could prove to explain why a “non-prejudiced” White person might become more frightened or alert when a non-threatening Black person approaches them, than when a non-threatening White person approaches them. Many people hold implicit prejudices about different groups of people, but are not aware that they believe one group is inferior or less capable than another. Through my experiment I will focus my attention on the prejudice or attitude domain that presumes that tall people are better leaders than short people.

The Attitude Domain of the Association between Height and Leadership:

Blaker et al. (2013) examined the understanding that tall people are perceived to have better leadership ability than short people. Blaker et al. (2013) found that, “For male leaders this height leadership advantage is mediated [or conveyed] by their perceived dominance, health, and intelligence; while for female leaders this effect is only mediated by perceived intelligence” (p.

17). Blaker et al. (2013) focus on the evolutionary reasonings for the creation of this attitude, explaining that height is evolutionarily perceived as a symbol for physical fitness, health, physical strength, and dominance, all characteristics necessary to lead a group on a hunting expedition in ancestral environments. These characteristics describe those which people expect leaders to have today, as a person with these attributes would seem to be a strong leader. Without having the physical attributes associated with strength, intelligence, and physical dominance, short people are often undermined for their leadership ability. This prejudice can lead to incorrect assumptions about short peoples' leadership potential, causing short people to be overlooked for leadership positions.

Although some research has begun to explore the relationship between height and leadership, this relationship is not commonly viewed by the public as a specific prejudice which needs to be addressed such as prejudices toward race, sexuality, or gender. This prejudice toward height, is not one that people intuitively recognize as a prejudice, or as a prejudice which they hold. As a result, many people may not realize they hold any internal prejudices against the perception of short people as leaders. Through my study, I explore Bard College students' perception of the relationship between height and leadership, and the methods that could be used to diminish any implicit prejudices about this attitude domain.

Articles Explored in Literature Review:

In Chapter Two, I will review further the preceding and other subject areas, which have created the basis for the theories behind my experiment and for the structure of my methods and procedure. I will review Heitland and Bohner's (2010) study, "Reducing Prejudice via Cognitive Dissonance: Individual Differences in Preference for Consistency Moderate the Effects of

Counter-Attitudinal Advocacy,” to explore how the creation of cognitive dissonance can lead to the diminishment of prejudices. I will review Likert’s (1967) discussion, “The Method of Constructing an Attitude Scale” to explain my use of the Likert scaling procedure to assess explicit attitudes. I will review Crowne and Marlowe’s (1960) study, “A New Scale of Social Desirability Independent of Psychopathology” to describe the importance of using a social desirability measurement as a predictor variable for the discrepancy between explicit and implicit attitudes. I will review the study by Greenwald et al. (1998), “Measuring Individual Differences in Implicit Cognition: The Implicit Association Test” and the study by Lemm et al. (2008), “Assessing Implicit Cognitions with a Paper-Format Implicit Association Test,” to justify my use of the Implicit Association Test (IAT), and specifically the paper-format of the IAT, to assess implicit attitudes. I will review the study by Kitayama et al. (2013), “Neural Mechanisms of Dissonance: An fMRI Investigation of Choice Justification,” to examine the use of a neurological measurement to measure cognitive dissonance. I will review Croyle and Cooper’s (1983) study, “Dissonance Arousal: Physiological Evidence,” and Elkin and Leippe’s (1986) study, “Physiological Arousal, Dissonance, and Attitude Change: Evidence for a Dissonance-Arousal Like and a ‘Don’t Remind Me’ Effect,” to show the reliability of a physiological measurement of dissonance over a self report. I will review the discussion by Dawson, et al. (2000), “The Electrodermal System,” to explain how the skin conductance response equipment measures cognitive dissonance. I will review Connolly and Hosken’s (2006) study, “The General and Specific Effects of Educational Programmes Aimed at Promoting Awareness of and Respect for Diversity Among Young Children,” to examine how educational interventions can be used to diminish prejudices. I will review the study by Blaker et al. (2013), “The Height Leadership

Advantage in Men and Women: Testing Evolutionary Psychology Predictions about the Perception of Tall Leaders,” to explain the rationale behind assessing the prejudice about height and leadership ability. All of these articles have played an important role in the development of my study.

Summary of Methods and Procedure:

The above content, details different theories and measurements that I used to create my experiment. In the following section, I will provide a summary for my experimental methods and procedure. There are three sessions for my experiment. I have separated the experiment into three sessions to give me time to calculate the results of each session, which will inform the procedure of the proceeding session. The following explanation is an overview of my methods which will be expanded in Chapter Three.

Session One: Measurement of Explicit Attitudes. In Session One, I will assess subjects' levels of social desirability and explicit attitudes. To test social desirability, I will use the Marlowe-Crowne Social Desirability Scale. This scale analyzes general levels of social desirability, by asking subjects to answer true or false to statements about everyday social behavior. I will then assess subjects' explicit attitudes using a 5-point scale I designed based on the Likert scaling procedure, which asks subjects to determine whether they agree or disagree with statements about height and leadership. The results from Session One will be used to determine which subjects will continue to Session Two. I will ask the twenty subjects with high levels of social desirability and extreme explicit attitudes to return for Session Two of my experiment. These subjects will include the ten subjects with high levels of social desirability who have the explicit attitude that height *does not* indicate leadership ability and the ten subjects with high levels of

social desirability who have the explicit attitude that height *does* indicate leadership ability. By using subjects with high levels of social desirability, it is likely that their explicit attitude about height and leadership indicates what they believe is the socially desirable attitude to have about height and leadership, but is not necessarily a reflection of their implicit attitude. As the prejudice toward height and leadership may be influenced by the society where the subject was raised, it is possible that some subjects will believe that it is socially desirable to hold the attitude that height *does not* indicate leadership ability, while others will believe it is socially desirable to believe that it *does*. I assume that because these twenty subjects show high levels of social desirability, their explicit attitudes will be connected with the attitude that they perceive to be socially desirable. With this being the case, the subjects' implicit attitudes will be inconsistent with their explicit attitudes because their implicit attitudes are not constructed based on socially desirable expectations as are explicit attitudes, but are constructed based on automatic evaluations of the situation or person (Greenwald, McGhee, and Schwartz, 1998). This inconsistency will be used to create cognitive dissonance in Session Three.

Session Two: Measurement of Implicit Attitudes. In this session, subjects will complete an initial Implicit Association Test, which I have designed to assess implicit attitudes about the association between height and leadership. I expect that the subjects whose explicit attitudes stated that height does not indicate leadership ability will hold implicit attitudes that state it does. I expect that the subjects whose explicit attitudes stated that height does indicate leadership ability will hold implicit attitudes that state it does not. These implicit attitudes reflect the attitudes that subjects are unaware they have by making subjects answer quickly, which inhibits the subjects' ability to think through their responses and prevents them from answering in a way they believe

is socially desirable. The implicit attitudes obtained in Session Two will be compared to the explicit attitudes obtained in Session One and will be used to create cognitive dissonance during Session Three. After the implicit attitudes are analyzed from Session Two, all twenty subjects will be asked to return for Session Three.

Session Three: Measurement and Reduction of Cognitive Dissonance. When observing the creation and reduction of cognitive dissonance it is important to account for the timing involved in this process. As my experiment is divided into three sessions, I will be sure to conduct all three sessions during a three week period to ensure that I will be able to assess the full amount of dissonance created by my experiment during Session Three, without being concerned about the possible decay of dissonance that could occur if it were to be tested over a long period of time. During this session, subjects will be hooked up to the skin conductance response equipment. This equipment is used to assess levels of arousal produced by cognitive dissonance. To obtain a baseline level of arousal, my subjects will read 20 nonsense syllables based on Hermann Ebbinghaus' design for his experimental study of memory. Unlike in Ebbinghaus' study, my subjects are only required to read these syllables, not attempt to memorize them. By using these syllables which do not invoke any imagery or meaning, I will be able to assess a baseline of arousal. Next, my subjects will be exposed to their results from Sessions One and Two. I will show the subjects the rate of discrepancy between their explicit and implicit attitudes about height and leadership. Once subjects view this discrepancy, they will begin to experience cognitive dissonance as they realize that they hold inconsistent attitudes. During the exposure to the discrepancy between the attitudes, the skin conductance response equipment will be used to assess the negative arousal created by the dissonance. Additionally, subjects are asked to

complete a second measure of cognitive dissonance, a self-assessment scale that will show the self-reported levels of discomfort or dissonance subjects believe they are experiencing.

To reduce the dissonance being experienced, subjects will be asked to write an explanation justifying why there is a discrepancy between their explicit and implicit attitudes. This process will be an interesting opportunity to understand how my subjects assign meaning to the results of the attitudes and more specifically, the role that the justification process plays in reducing dissonance. After this assignment, subjects will be split into an experimental and control group. The experimental group will receive an educational intervention. Subjects in the experimental group will read about fifteen respected leaders and their role in history, as well as their height. All the leaders listed are strong leaders whose height is below average. The control group will not be asked to read this list. By using an educational component, I will hopefully be able to assess how educational interventions influence the potential change in attitudes after dissonance is created. After this task, the skin conductance response equipment will be used to assess whether subjects' levels of arousal have been reduced. All subjects will then complete a final Implicit Association Test, which will be the same test from Session Two. This test will be used to assess whether subjects' implicit attitudes have intensified or diminished due to the creation of dissonance. Through this procedure, I will be able to determine how cognitive dissonance and dissonance reduction affects prejudice formation, as well as understanding the physiological arousal produced by cognitive dissonance.

Expected Results:

The results I find in each session of my experiment will help determine the results in the following sessions. Within Session One, I expect to have four types of subjects. The first type

will display *high levels* of social desirability and an explicit attitude that height *is not* positively correlated with leadership ability. The second type will display *low levels* of social desirability and an explicit attitude that height *is not* positively correlated with leadership ability. The third type will display *high levels* of social desirability and an explicit attitude that height *is* positively correlated with leadership ability. And the fourth type will display *low levels* of social desirability and an explicit attitude that height *is* positively correlated with leadership ability. As explained earlier, I will be using the subjects that fall in the first and third type for the Sessions Two and Three because they display high levels of social desirability. I expect that subjects' implicit attitudes, as assessed by the Implicit Association Test, will conflict with their explicit attitudes that reflect their high levels of social desirability. Subjects with low social desirability, in contrast, would not have a significant discrepancy between their explicit and implicit attitudes because their explicit attitudes were not determined by their need to be socially desirable, but instead are more likely to be consistent with their implicit attitudes.

I expect that by showing subjects a discrepancy between their explicit and implicit attitudes, I will be able to assess high levels of arousal that indicate high magnitudes of dissonance by using the skin conductance response equipment and the self-assessment of dissonance scale. The creation of dissonance will ensure that subjects will be motivated to reduce the dissonance, which could lead to the intensification or diminishment of their prejudice against height and leadership ability. The justification writing process will mainly function to give subjects an opportunity to reduce the dissonance created.

The educational intervention will also help subjects reduce the dissonance created. I expect that subjects who receive the educational intervention, regardless of whether they have a

high or low discrepancy between their explicit and implicit attitudes, will diminish their implicit prejudices about height and leadership. By learning about short leaders, these subjects will become more influenced by the idea that height does not affect leadership ability. I expect that subjects who do not receive the educational intervention, will intensify their implicit prejudices or their level of prejudice will remain the same. Through this educational intervention, I hope to understand how education about a discriminated group can diminish prejudices. By examining the relationship between cognitive dissonance and the prejudice that positively correlates height and leadership, I hope to provide a stepping stone to understand the underlying relationship between cognitive dissonance and prejudice, specifically the role that cognitive dissonance plays in the formation of all prejudices.

CHAPTER TWO: LITERATURE REVIEW

Cognitive Dissonance and Prejudice; Implicit and Explicit Attitudes: Implicit Attitudes, Explicit Attitudes; Social Desirability as a Predictor of the Discrepancy; Measuring Cognitive Dissonance: Neurological Measurements of Cognitive Dissonance, Autonomic Nervous System, Physiological Measurements of Cognitive Dissonance, Electrodermal Activity; Educational Intervention; The Prejudiced Attitude Regarding Height and Leadership

Cognitive Dissonance and Prejudice:

Festinger (1957) explained that peoples' cognitions are challenged when they are presented with information that is inconsistent with these cognitions. Festinger emphasized that, "By the term *cognition*...I mean knowledge, opinion, or belief about the environment, about oneself, or about one's behavior" (p. 3). When a dissonant relationship between cognitions is created, due to new events that happen, new information that is presented, or everyday inconsistencies, such as the decision to choose between a mode of transportation where one is faster but the other is cheaper, we become at least somewhat aware of the inconsistency, feel psychological discomfort, and are motivated to reduce this discomfort by changing the cognition or finding information that supports the original cognition. The more aware someone is about this inconsistency, the greater the magnitude of cognitive dissonance created and the greater the motivation to reduce the dissonance. As they attempt to reduce the dissonance, the original cognition will either be reinforced through the rejection of the presented information, or the original cognition will begin to change through the acceptance that the presented information has value. We can transfer this logic of the understanding that cognitive dissonance plays a role in the formation and changing of cognitions to the formation of attitudes and prejudices, to specifically examine the role that cognitive dissonance plays in the intensification and diminishment of prejudices. For the purposes of this study, prejudice is interpreted to mean the

learned judgments or attitudes that can lead to discriminatory behavior against people of a specific subgroup. Prejudices are often learned and engrained through societal, cultural, or familial influences. Sometimes people are aware they hold prejudices, while other times they are unaware that they hold prejudices. When people are unaware of the prejudices they hold, these prejudices are called implicit prejudices. For this study, we are focusing on these implicit prejudices because they can represent an inconsistency among someone's attitudes about a specific attitude domain, which may lead to the creation of cognitive dissonance once that person is made aware of the inconsistency.

A recent study by Heitland and Bohner (2010) demonstrates how prejudices can be diminished through the creation of cognitive dissonance. For their study, they expected that a subject's preference for consistency could moderate the effects of dissonance. Heitland and Bohner explain that preference for consistency (PFC) is a "personality trait [that] is composed of (1) the motive to be consistent with one's own response, (2) the desire to appear consistent to others, and (3) the desire that others appear consistent," meaning that someone with a preference for consistency wants oneself and others to have consistent thoughts and behaviors (p. 165). Preference for consistency is seen as a personality trait because someone with a preference for consistency habitually behaves in a way that ensures their attitudes and behaviors are consistent. As cognitive dissonance is created when attitudes are inconsistent, Heitland and Bohner expected that subjects with high PFC would have lower prejudice levels after generating counter-attitudinal arguments about integrated housing between Germans and Turks. Throughout the study, German participants were asked to develop positive arguments for initiating a project to integrate housing. (Integrated housing, meaning integrated apartment buildings, where an

apartment with German residents would be neighbors to an apartment with Turkish residents.)

Heitland and Bohner placed subjects in high- and low-choice conditions to create cognitive dissonance. With counter-attitudinal arguments, it is expected that subjects in the high-choice condition will experience higher levels of dissonance because they are actively choosing to argue for an attitude with which they claim to disagree. As this condition is expected to create greater dissonance, Heitland and Bohner predicted “greater attitude change for high-PFC participants in the high-choice conditions (Hypothesis 1),” leading to a reduction in prejudices against Turks (p. 173). Their results supported this prediction, showing that participants with high-PFC in the high choice condition reduced their prejudices, in part, to ensure that their attitude would be consistent with the counter-attitudinal argument they had made. These participants “reported marginally lower generalized prejudice ($M = -.15$) than did high-PFC participants in the control condition ($M = .32$), $t(21.5)=1.91, p=.07$ ” (Heitland and Bohner, p. 174). Heitland and Bohner even found that this reduction of prejudice in high-PFC participants who were in the high-choice condition was still present in the post-test four weeks later. These results show a clear relationship between the presence of cognitive dissonance assessed in this study and the reduction of prejudice.

Heitland and Bohner’s (2010) study furthers the research that connects cognitive dissonance and prejudice. Their methodology of using counter-attitudinal arguments is a common method used to create dissonance (see Croyle & Cooper, 1983, and Elkin & Leippe, 1986). Although this method does appear to produce dissonance, there are some lingering questions about its effectiveness. The rationale behind counter-attitudinal arguments or essays expects that a subject who has more of a choice to argue in favor of an attitude toward which the subject disagrees will likely feel more dissonance or discomfort because the subject is aware that

there is an active choice in deciding to write a counter-attitudinal argument, rather than being forced to do so, which would be less of a conflict of interest because the subject was unable to refuse to write the argument even if the subject disagreed with the written argument. Although a subject who has the choice to write an counter-attitudinal argument may feel uncomfortable, the dissonance created may not be too great because the subject is aware that they do not believe in the argument and are only completing the task out of a sense of responsibility to help the experimenter and complete the assignment, even though they are not obligated to stay. Although it would be difficult to leave in the middle of this process, I would expect that someone who is experiencing great amounts of dissonance would either leave, make some attempt to leave, or question the assignment. However, Heitland and Bohner do not report any subjects who even questioned the need to stay.

As the subjects in Heitland and Bohner's (2010) study, as well as others where the method of counter-attitudinal arguments is used, did not refuse to participate, I suspect that the discomfort or dissonance created through counter-attitudinal arguments, may not have been very great. This assumption is based on Festinger's (1957) hypothesis that, "When dissonance is present, in addition to trying to reduce it, the person will actively avoid situations and information which would likely increase the dissonance" (p. 3). As this does not seem to be the case when subjects participate in a counter-attitudinal essay, I intend to develop a different method that would more effectively create dissonance. I start by focusing on the basic hypothesis of cognitive dissonance that, "The existence of dissonance, being psychologically uncomfortable, will motivate the person to try to reduce the dissonance and achieve consonance" (p. 3). As Festinger explains that dissonance can also be defined as inconsistencies

between a person's thoughts, behaviors, or attitudes, I decided to closely examine the relationship between explicit and implicit attitudes, which researchers have learned can conflict or be inconsistent. Meaning, some people may hold an explicit attitude that is inconsistent with their implicit attitude about a specific attitude domain, especially relating to prejudices (Devine, 1989).

Implicit and Explicit Attitudes:

Implicit Attitudes. People can have public or explicit attitudes as well as private or implicit attitudes (Wilson, Lindsey, and Schooler, 2000). By public or explicit I mean, an attitude that someone is aware they hold and acts upon, and by private or implicit I mean, an attitude that someone is unaware they hold. I decided to look further into the relationship between explicit and implicit attitudes because studies have shown that people can have implicit attitudes that indicate an implicit prejudice or attitude that is not reflected by that person's explicit attitude. I was drawn to the inconsistencies that could develop within an attitude domain due to the way that implicit attitudes are formed. Greenwald et al. (1998) explain that, "Implicit attitudes are manifest as actions or judgments that are under the control of automatically activated evaluations, without the performer's awareness of that causation (Greenwald & Banaji, 1995, pp. 6-8)" (p. 1464). As implicit attitudes are automatic evaluations, which are based on an uncontrolled response, they may differ from an explicit attitude that someone is able to control, an attitude they want to demonstrate they hold about a particular attitude domain. This understanding of implicit attitudes led to the creation of the Implicit Association Test (IAT), which allows researchers to determine someone's automatic evaluation about a specific attitude domain through an intentionally hurried categorization task. Greenwald et al. explain how the

IAT measures “implicit attitudes by measuring their underlying automatic evaluation. The IAT is therefore similar in intent to cognitive priming procedures for measuring automatic affect or attitude” (p. 1464). By forcing subjects to quickly evaluate and categorize words, Greenwald et al. were able to identify the subjects’ attitudes about different concept associations that the subjects were unaware they held. As subjects are unable to control their responses, “The sensitivity of IAT measures to automatically activated associations is sometimes credited with making IAT scores resistant (even if not immune) to faking” (Greenwald, Poehlman, Uhlmann, and Banaji, 2009, p. 18). The IAT is seen as a strong measurement that is guaranteed to reveal someone’s implicit attitudes. With this tool, we can present subjects with proof that their implicit attitude is inconsistent with their explicit attitude.

Greenwald et al. (1998) tested this measurement in three separate experiments. In the first experiment, they looked at “two target-concept discriminations: (a) flower names...versus insect names...and (b) musical instrument names...versus weapon names...Each target-concept discrimination was used in combination with discrimination of pleasant meaning words...from unpleasant meaning words” (Greenwald et al., p. 1466). Subjects categorized the words in the target-concepts by quickly pressing the assigned computer key to ensure that their response would reflect an automatic evaluation. Subjects completed trial blocks of 50 trials and their score was evaluated based on their response latency, which was measured by the computer program. After completing the categorization task, subjects were asked to complete an explicit attitude measurement that measured subjects’ “...attitudes toward the four target concepts. On the feeling thermometer, subjects were asked to describe their general level of warmth or coolness toward flowers, insects, musical instruments, and weapons...” (Greenwald et al., p. 1467). Subjects also

completed five semantic differential items. Greenwald et al. found that subjects performed faster when the association was common and more agreeable, meaning, "...subjects performed faster for flower + pleasant or instrument + pleasant combinations than for insect + pleasant or weapon + pleasant" (p. 1468). There was a low contrast between the implicit and explicit attitudes, which Greenwald et al. attributed to the commonly held association between flowers and pleasantness and musical instruments and pleasantness.

Although the second and third experiment are similar in their discussion of discriminatory attitudes, we will focus on the third experiment which focuses on racial prejudices and stereotyping, rather than the second experiment, which focuses on in-group versus out-group attitudes. In the third experiment, Greenwald et al. (1998) used the IAT method to "measure an implicit attitude that might not readily be detected through explicit self-report measures" (p. 1473). This experiment asked subjects to categorize Black (Latonya, Shavonn, Tashika, Ebony) and White (Meredith, Heather, Katie, Betsy) names while discriminating pleasant (lucky, honor, gift, happy) versus unpleasant (poison, grief, disaster, hatred) word meanings (Greenwald et al.). The method was the same as the first experiment except they used identity and attitude questionnaires along with semantic differential items and the feeling thermometer, which asked subjects to mark on a "thermometer" how warm/favorable or cold/unfavorable they were toward the pleasant words, unpleasant words, Black names, and White names. Greenwald et al. found that there was "an implicit attitudinal preference for White over Black, manifest as faster responding for the White + pleasant combination (white bars in figure 5) than for the Black + pleasant combination (black bars)" (p. 1474). When comparing the results from the implicit attitude to the explicit attitude, they found that, "White subjects (19 of 26) [who] explicitly

endorsed a position of either Black-White indifference (zero on the semantic differential) or Black preference (a positive semantic differential score)...[implicitly indicated] White preference” (Greenwald et al., p. 1475). Through the IAT method, Greenwald et al. were able to determine the difference between a subjects’ explicit and implicit attitudes. This shows us how people may hold implicit prejudices even when they state explicitly that they do not hold these prejudices. I decided to use the Implicit Association Test to assess my subjects’ implicit attitudes to assess their automatic evaluations, which would indicate their uncontrolled levels of prejudices about the correlation between height and leadership. As it is difficult for subjects to control or fake their answers on the IAT, this test will show subjects that they hold implicit prejudices. Although subjects could deny that their test results are correct and there is an inconsistency between their attitudes, the IAT provides solid evidence that subjects’ implicit attitudes are inconsistent with their explicit attitudes. All this leads to the possible and even sure creation of cognitive dissonance.

The Implicit Association Test is most commonly performed on a computer. As I had limited access to computers with the technology to record response times acquired during the IAT, I used the paper-format of the IAT instead. The paper-format, as described by Lemm, Lane, Sattle, Khan, and Nosek (2008), is very similar to the computer-format. The main difference is that the subjects’ response is not measured based on latency, but rather a comparison of how many and how accurately—accurately, meaning that the subject correctly marks a word that falls into the *pleasant* category as *pleasant*, instead of as *unpleasant*—subjects can categorize forty words in a fixed time period (generally 20 seconds) when, for example, White + pleasant are paired versus when Black + pleasant are paired in two categorization blocks (Lemm et al., 2008).

As all subjects have different response rates, the calculation that determines a subject's implicit attitudes is not solely based on how many words the subject categorizes accurately, but the ratio and the difference between the two categorization blocks. I will expand on the use and the specifics of this calculation in Chapter Three when I describe the procedure for analyzing the data measured by the IAT.

Explicit Attitudes. As explained earlier, the purpose of using the Implicit Association Test is not only to determine subjects' implicit attitudes, which in turn enables us to understand whether they hold implicit prejudices, but more importantly for my experiment, it is used in comparison to explicit attitudes. The explicit attitude represents what a subject is aware or believes their attitude about a prejudice is or possibly what they believe it should be. When a subject believes that they hold a particular attitude about an attitude domain, but is then shown that their automatic response to the attitude domain is inconsistent with this belief, I contend that dissonance is created. This is based on Festinger's (1957) understanding that presented information that is dissonant with previous cognitions or attitudes, will lead to the creation of cognitive dissonance.

There are many measurements that can be used to assess explicit attitudes. After careful consideration of a variety of measurements, I settled on the classic and effective Likert scaling procedure. This scaling procedure can be compared with other measures of attitude, such as a behavioral measurement. A behavioral measurement observes subjects' actions, while a scaling measurement allows subjects' to reflect and interpret their own feelings or attitudes. By allowing subjects to describe their own attitudes, we may gain more insight into the subjects' attitudes because they would not feel obligated to perform or answer the scale in a certain way, as they

might on a behavioral measurement where their actions are seen and observed, not anonymous. When Rensis Likert (1967) created this scaling procedure, he intended to develop a procedure that would accurately assess peoples' attitudes on a variety of attitude domains. He was not necessarily focused on or even considering using this procedure to measure explicit attitudes. However, as this scaling procedure does not require a hurried response that would create an automatic evaluation, it is expected that the attitude assessed through this procedure will reflect a subject's explicit attitude. Likert determined that the best way to assess attitudes was to ask subjects to respond to statements by choosing how strongly they agree with or approve of a statement. The statements are all "expressions of *desired behavior* and not statements of *fact*" (Likert, p. 90). Likert explains that the items on the scale should not be repetitive and should be balanced to prevent a response bias. This will ensure that subjects responses reflect their explicit attitude, rather than being guided by an expectation that the experimenter is searching for a specific response, which the subjects determined based on the wording and organization of the statements. Each item is rated on an odd-numbered scale, often 1-5. For example, subjects can respond to a statement by saying that they *strongly agree, agree, neutral/ undecided, disagree, or strongly disagree* with the statement (Likert). After each item receives a score, it is possible to calculate the strength of a subjects' attitude. These calculations enable us to evaluate what constitutes a strong attitude in either direction, while also being able to compare subjects and their attitudes, which can demonstrate the general attitude of a particular group of people.

By using the results from the Likert scaling procedure as a measurement of explicit attitudes and the results from the IAT as a measurement of implicit attitudes, we are able to

identify and measure a contrast between the subject's explicit and implicit attitudes. As far as my research of the literature has shown, there are no other studies that use the process of presenting subjects with the discrepancy between their explicit and implicit attitudes as a method of creating cognitive dissonance. I believe that this method has the potential to produce greater magnitudes of dissonance, than the magnitudes of dissonance produced by counter-attitudinal essays or arguments. I believe that it is more dissonance producing for subjects to view a discrepancy between their explicit and implicit attitudes that they had previously held, than to write a positive argument about an attitude domain with which they disagree because for the latter the subjects know that they disagree with what they are writing and they know why they are choosing to write it, but for the former they cannot as easily explain why they already held these inconsistent attitudes, especially when they likely believed that their explicit attitude was their only attitude about the specific attitude domain. This internal inconsistency has more value, which produces more dissonance.

Social Desirability as a Predictor of the Discrepancy:

For my experiment however, I did not want to only use the explicit attitude. I needed a measurement that would help me predict which subjects would be likely to have inconsistent explicit and implicit attitudes. As explicit attitudes can reflect what subjects believe their attitudes should be, I wanted to use a measurement that would evaluate the likelihood that subjects make decisions or adjust their attitudes and behaviors based on what the subjects expect is the best or socially desirable attitude and behavior. This measurement would act as a predictor variable, enhancing the likelihood that the subjects would have a discrepancy between their explicit and implicit attitudes. This is because subjects who act in ways that they expect will be

socially desirable, will likely have explicit attitudes that they expect will be socially desirable, while their implicit attitudes will reflect their automatic evaluations of a situation, which is less likely to be a socially desirable reaction. This led me to the theory of social desirability.

Crowne and Marlowe (1960) were determined to develop a scale that accurately evaluated social desirability. They defined social desirability as, "...a need for social approval and acceptance and the belief that this can be attained by means of culturally acceptable and appropriate behaviors" (Crowne and Marlowe, 1961, p. 109). They examined previous social desirability scales and recognized that the subjects who completed these scales were likely "influenced by non-test-relevant response determinants," which had been determined by previous research (Crowne and Marlowe, 1960, p. 349). The problem that has occurred with these previous models is that they are based on a statistical deviance model. This means that, as can be seen in the Edwards Social Desirability Scale, the items that are in the scale all have "extreme social desirability scale positions or, in other words, [are] statistically deviant" (Crowne and Marlowe, p. 349). When using a statistically deviant model, some of the items being used in the scale may not be constructed to reflect specific populations. Crowne and Marlowe use the example that, "When [college students] given the Edwards SDS deny, for example, that their sleep is fitful and disturbed or that they worry quite a bit over possible misfortunes, it cannot be determined whether these responses are attributable to social desirability or a genuine absence of such symptoms" (p. 349). Crowne and Marlowe want to ensure that the items on their scale of social desirability reflect subjects' desire to present themselves in a socially desirable way, while not making the subjects appear socially desirable when they lack the symptom presented in the item. Crowne and Marlowe developed a scale

based on a "...defined universe. [Meaning, they defined the criteria for a collection of items, "the universe," that could potentially be used to depict and measure social desirability.] The population from which items were drawn is defined by behaviors which are culturally sanctioned and approved but which are improbable of occurrence" (p. 350). The scale created includes 33-items, which are all answered as true or false statements. The following is an example of these items, "13. No matter who I'm talking to, I'm always a good listener" (Crowne and Marlowe, p. 351; full scale in Appendix E). It is socially desirable and expected for people to listen fully when others are talking to them. However, I'm sure that we all can think of a time or many when we ourselves were not attentive listeners when someone was talking to us. This distinction lies at the heart of Crowne and Marlowe's understanding of social desirability as a need for approval, which brings us back to the connection between social desirability and explicit attitudes.

Based on the explanation from Crowne and Marlowe (1960), we understand that someone who has a high score on the social desirability scale seeks approval and wants to be seen as someone whose attitudes reflect culturally appropriate standards. For my experiment, I expect that a subject who wants to be seen as having culturally appropriate attitudes would complete an explicit attitude measurement in a way that they perceive as culturally appropriate and acceptable. Meaning, as relating to my experiment, that subjects who have a high score on the social desirability scale will want to be seen as someone with a non-prejudiced attitude, as non-prejudiced attitudes, rather than prejudiced attitudes, are commonly viewed as culturally appropriate and socially acceptable. Using this understanding, I determined that a subject who has a high score on the Marlowe-Crowne Social Desirability Scale (MC-SDS) will be likely to have an explicit attitude that is inconsistent with their implicit attitude because their explicit

attitude will be calculated to ensure that they are perceived as culturally appropriate, while their implicit attitudes will likely be based on automatic evaluations, which they will be unable to control for cultural appropriateness. By using levels of social desirability as the predictor variable of this discrepancy, I am better able to predict which subjects are most likely to experience dissonance. The ability to predict which subjects are likely to experience dissonance, leads me to the important question: what is the best way to measure the dissonance or discomfort that is created? As the magnitude of dissonance created can impact if or how much the attitude is changed, an accurate measurement of dissonance will help us understand how great the magnitude of dissonance needs to be to ensure there will be an attitude change. To fully understand the importance of this dilemma, I will turn back to Festinger's (1957) discussion of the magnitude of dissonance in the following section.

Measuring Cognitive Dissonance:

In Chapter One we discussed the importance of accurately measuring the presence of dissonance. Because of the importance of this matter, I am going to review the methods that had been used to measure dissonance and explain why they are not satisfactory. One method Festinger (1957) used to measure dissonance was to use behavioral tasks, such as observing how often and for how long subjects would look at photos of the car they decided to buy.² As the decision of which car to buy can be difficult when there are two or more good options available, the decision making process can cause someone to experience dissonance when there is no particular reason to choose one car over the other. A subject who spent a significant amount of

² Festinger describes the experiment by Ehrlich, Guttman, Schönbach, and Mills that examines the creation of dissonance after subjects buy a car. D. Ehrlich, I. Guttman, P. Schönbach, & J. Mills (1957), "Post Decision Exposure to Relevant Information," *Abnormal and Social Psychology*, 54, 98-102.

time looking at information about the car they decided to purchase, is attempting to reduce the dissonance that had been created when faced with the decision of picking a car. The subject used this information to justify and confirm their decision to buy the particular car, enabling the subject to feel comfortable and satisfied with the decision. This is because of the nature of advertising, which only provides positive information about the product. Although we can make inferences about the amount of dissonance created, based on the length of time subjects spent searching for or reading advertisements, this measure only represents the pressure that subjects felt to reduce the dissonance, not the magnitude of dissonance itself. Although the discomfort created by dissonant cognitions, produces a specific amount of pressure that should be used to reduce the dissonance, it is possible that some people will not completely reduce this discomfort and the pressure assessed by this measurement may not depict the full extent of the dissonance or pressure to reduce the dissonance that was actually created.

Self-assessments are also used to measure the dissonance created. Festinger (1957) describes an experiment by Janis and King (1954) where subjects were asked to actively (make up an argument) or passively (read notes from an outline) give a counter-attitudinal speech.³ When they finished the speech they responded to a questionnaire that asked them how good of a job they had done on the speech. Festinger explains that subjects who had reported that they had not done a satisfactory job, "...had little dissonance between their private opinions and their knowledge of what they were overtly doing or saying" (p. 112). He explained that subjects with high dissonance would have high self-ratings because the high self-rating indicated that they complied with the task that asked them to actively present a counter-attitudinal speech, which

³ I. Janis and B. King (1954), "The Influence of Role-Playing on Opinion Change," *Journal of Abnormal and Social Psychology*, 49, 211-218.

was inconsistent with their private opinion about the topic, creating a greater magnitude of dissonance. This type of measurement theoretically is able to assess the amount or magnitude of dissonance that is created because we can interpret that dissonance is created based on the type of responses reported by the subjects, but as we have observed through our examination of explicit attitudes and social desirability versus implicit attitudes, self-reporting can often misrepresent the information we are looking to observe.

Although we can observe subjects' responses on behavioral or scaling measures, whether it is how often or how long a subject searches for and reads reviews for the car they just bought or how satisfactorily they believe they completed a task, and equate these responses to dissonance based on our expectations for how dissonance would affect the subjects' actions, there is always the risk that these measurements may misrepresent the exact magnitude of dissonance created. As subjects may not be fully aware or capable of expressing the exact feelings and sensations that they experience when dissonance is created or adjust what they feel and believe to correspond with the answers they expect the experimenter is hoping to find, these behavioral and scaling measurements do not guarantee that the magnitude of dissonance reported coincides with the magnitude of dissonance created. Behavioral and scaling measurements only provide inferential interpretations of the dissonance created. Specifically with self-reports, there are individual differences or a sub-threshold for awareness for how attuned and subjective someone is when interpreting the physical sensations created by cognitive dissonance. It is advantageous to complement a behavioral or scaling measurement with a psychophysiological measurement when assessing cognitive dissonance because we can confirm the validity of the behavioral or scaling measurement by comparing it to the results of the psychophysiological measurement.

Psychophysiological measurements are based on activity in the brain or the body, specifically the autonomic nervous system (ANS), which provide objective measures of brain region activation and arousal. (I will continue to discuss the use and interpretation of brain region activation and ANS activity below.) We can also use both measures as insurance. In case one does not work, we are still able to assess the cognitive dissonance created, even if it was not to the extent that we had wanted. Since we are unable to control our brain activity and ANS response to presented information, a psychophysiological measurement can express how our bodies are responding without being compromised by an attempt to hide or a misinterpretation of what we are experiencing.

Using a psychophysiological measurement also enables us to discover the limits of the creation of cognitive dissonance. We want to measure the magnitude of dissonance created to ensure that the magnitude created is not too high. Festinger (1957) explains that,

The maximum dissonance that can possibly exist between any two elements is equal to the total resistance to change of the less resistant element. The magnitude of dissonance cannot exceed this amount because, at this point of maximum possible dissonance, the less resistant element would change, thus eliminating the dissonance. (p. 28)

This means that if too much discomfort is created by the dissonant relationship, the new information is disregarded and the original cognition remains the same, as if the new information had never been learned, eliminating the dissonant relationship. If the dissonance is eliminated, then it cannot be reduced, which means that the attitude will not be changed. By being able to measure the exact amount and the limit of the magnitude of dissonance that can be created by using a psychophysiological measurement, we can predict how much pressure is needed to reduce the dissonance and how much dissonance will lead to a change in attitude, which may

inform how we might want to create dissonance to ensure that attitudes will be changed and prejudices reduced.

Neurological Measurements of Cognitive Dissonance. When Festinger was working with the theory of cognitive dissonance, the technology in the field had not yet advanced to the point of using physiological or neurological measurements—both are now used to study psychophysiological responses—to study these types of behavioral processes. With the new technology we have available, it is possible to empirically measure the magnitude of dissonance created. A recent study by Kitayama et al. (2013) demonstrates the neural mechanisms activated during dissonance creation, using a functional magnetic resonance imaging (fMRI). They focused on the relationship between choice making and brain activity, as the creation of dissonance is largely connected to the decision making process, while specifically looking at the brain regions involved with negative emotional arousal produced by a cognitive conflict and self-processing due to choice justification (Kitayama et al.). Kitayama et al. explain that these processes would likely activate the dorsal anterior cingulate cortex (dACC) when there is a cognitive conflict, the anterior insula (aINS) when there is negative emotional arousal, and the medial prefrontal cortex (mPFC) and the posterior cingulate cortex/precuneus (PCCC/Pcu) when someone is self-processing. By using the fMRI, Kitayama et al. were able to assess which brain regions were activated when subjects were asked to rank, pick, and justify their choice for picking CDs. Kitayama et al. found the following:

...an increased activation in the dorsal anterior cingulate cortex (dACC) and left anterior insula (left aINS) during difficult choices relative to easy choices (see Table 1)...[And] A significant positive correlation was obtained for PCC when the extent of liking increase for chosen CDs was used as a measure of choice-justifying attitude change (see the left image in Fig. 3). (pp. 208-209)

By observing which brain regions were activated during the choice making process, Kitayama et al. were able to determine when cognitive dissonance was created based on the brain regions that were activated. Although we can determine that cognitive dissonance has been created, the fMRI does not clearly show how much activity is occurring in the brain region, only that the brain region was or was not activated during a difficult choice. This activity indicates the creation of cognitive dissonance, but it does not express the magnitude of dissonance created.

Autonomic Nervous System. As we saw, the left aINS was activated, which can indicate the activation of the body's stress response as controlled by the autonomic nervous system. Clark, Boutros, and Mendez (2010) explain that, "The insula along with the amygdala plays a role in anxiety...The anterior/middle insula is activated in control subjects in anticipation of negative compared with positive stimuli" (p. 68). With the understanding that the left aINS was activated when Kitayama et al. (2013) were studying cognitive dissonance, we can expect that a physiological measurement that is able to measure negative arousal or stress, would be able to measure the magnitude of cognitive dissonance created.

The activation of the ANS is the body's first response to a stressor. There are two branches of the ANS, the sympathetic and parasympathetic nervous system. The sympathetic nervous system is activated to help the body deal with stress, while the parasympathetic nervous system helps keep the body calm and conserves energy (Garrett, 2011). When the sympathetic nervous system is activated it sends signals to various parts of the brain and body to ensure that the body will be prepared to confront the stressor. As I will discuss below, one of the signals sent during this process activates sweat glands. By measuring the body's physiological response to

stress, such as how sweaty they become, we can equate subjects' stress levels to the magnitude of dissonance created.

Physiological Measurements of Cognitive Dissonance. An expectedly reliable physiological measurement used to measure cognitive dissonance is the Galvanic Skin Response (GSR), more commonly known today as the Skin Conductance Response (SCR). I will first demonstrate the theoretical connection between GSR or SCR equipment and its ability to accurately assess the magnitude of cognitive dissonance created and then I will elaborate on the science behind the procedure. Croyle & Cooper (1983) and Elkin & Leippe (1986) demonstrate the effectiveness of using GSR equipment to determine the physiological response produced by cognitive dissonance. Largely they are assessing the negative emotional arousal that was observed in the study of Kitayama et al. (2013). In Croyle and Cooper's (1983) study, they used both SCR to measure autonomic arousal and heart rate to measure general bodily activation. They created dissonance using the counter-attitudinal essay method. The results showed that, "Subjects in the high-choice counter-attitudinal essay (cognitive dissonance) condition were more aroused after writing the essay than subjects in the other two conditions" (Croyle and Cooper, p. 788). Croyle and Cooper attribute this arousal to the creation of dissonance, but they also explain that the subjects in this condition did not consequentially show attitude change. They suggest that, "...the mere presence of the physiological recording device may have played a direct role in the prevention of attitude change" (Croyle and Cooper, p. 788). If dissonance was created, however, we would expect that the discomfort from the dissonance would have motivated subjects to reduce the dissonance, leading to attitude change. As this was not the case, it is possible that the arousal recorded was not related to dissonance but to another stimulus, potentially even the

equipment itself. Croyle and Cooper also found that the general bodily activation recorded through heart rate was not significant in evaluating the dissonance created. From these results, it is unclear if dissonance was definitely created, confirming my speculations that the counter-attitudinal essay does not produce a great magnitude of dissonance that could lead to attitude change. However, as the SCR equipment is shown to measure arousal, it still has the potential to measure the magnitude of cognitive dissonance created.

Elkin and Leippe (1986) replicated and extended Croyle and Cooper's (1983) study to better understand the relationship between cognitive dissonance and the physiological arousal recorded by the SCR equipment. In Elkin and Leippe's experiment they used Croyle and Cooper's method of having subjects write counter-attitudinal essays while recording their skin conductance response, but extended this method to assess levels of physiological arousal that were produced after subjects had the opportunity to change their attitude. This examination enabled them to determine whether the discomfort created by dissonance was reduced when subjects changed their attitude. Elkin and Leippe found that, "...arousal did not decline once high-dissonance subjects indicated change on the postessay scale, even 4-7 min following the attitude response" (p. 63). They presume that the reason for the lack of decline was due to the timeframe of the experiment. They expected that the arousal produced would likely decline later than they had recorded. Timing can be a complicated issue when reducing dissonance because sometimes dissonance is reduced through a quickened thought process and other times it takes longer because people are looking for information that will help reduce the dissonance. It is possible that the arousal would take longer to decline, but if so we would expect that the attitude change would not have occurred until after the decline since, according to the theory of cognitive

dissonance, attitude change is a result of the reduction of dissonance. Since Elkin and Leippe found a change in attitude, but not a decline in arousal, it can be inferred that the arousal recorded by the SCR equipment during this experiment was not a measure of dissonance because we know that attitudes are changed when dissonance is reduced, which would have been indicated by a decline in arousal.

Croyle and Cooper's (1983) along with Elkin and Leippe's (1986) evaluation of the reliability of using SCR equipment to empirically evaluate the magnitude of cognitive dissonance created, enabled me to create an experiment that would accurately assess the magnitude of dissonance created when subjects are confronted with a discrepancy between their explicit and implicit attitudes. Although their results seem to indicate that the SCR equipment did not fully measure the possible dissonance created, theory and logic behind SCR still has the potential to measure the negative arousal produced by the creation of cognitive dissonance. As discussed earlier, I expect that when subjects are confronted with the discrepancy between their explicit and implicit attitudes, the SCR equipment will measure a greater magnitude of dissonance than if they completed a counter-attitudinal essay because they are confronted with the understanding that they hold and have possibly always held inconsistent attitudes about the particular attitude domain. By being confronted with this discrepancy, subjects are not only likely to feel discomfort due to the dissonant relationship between the attitudes, but are also likely to feel discomfort knowing that their self-image is dissonant with their implicit prejudices, leading to the creation of a greater magnitude of dissonance.

Electrodermal Activity. As discussed earlier, cognitive dissonance has been shown to be related to a stress response based on the findings by Kityama et al. (2013) that the left anterior insula

was activated when they were studying cognitive dissonance. This is logical because when two cognitions are dissonant, we feel uncomfortable or stressed until we can reduce the discomfort by changing our attitude so our cognitions will become consonant. This implies that cognitive dissonance is a subset of our defense mechanism to a threat. When our stress response is activated through the sympathetic nervous system, our sweat glands are activated. The level of sweat produced during this process can be measured using the skin conductance response equipment by assessing electrodermal activity. When we assess the electrodermal activity that is conducted by the level of sweat produced during the stress response when cognitive dissonance is created, we can measure the magnitude of dissonance.

The greater the stress experienced, the greater the electrodermal activity (EDA). EDA is assessed by recording how much sweat is produced in the eccrine sweat glands. Dawson, Schell, and Filion (2000) explain that the eccrine sweat glands, which are

...located on the palmar and plantar surfaces have been thought of as being more concerned with grasping behavior than with evaporative cooling (Edelberg 1972a), and it has been suggested that they are more responsive to significant or emotional stimuli than to thermal stimuli. (p. 202)

This means that the eccrine sweat glands are likely to be activated when someone is feeling emotionally stressed because, evolutionarily, increased sweat on the hands will enable them to strengthen their grip when trying to grasp something that may help them combat the stressor. When subjects are stressed it produces a change in the level of sweat produced by the eccrine sweat glands, which causes changes in "...the values of the variable resistors and yields observable changes in EDA" (Dawson et al., p. 203). By observing the change in levels of EDA, we can determine the skin conductance response, which can be interpreted as the magnitude of dissonance created.

To understand how electrodermal activity can be recording using the skin conductance response equipment, we need to have a better understanding of the scientific processes involved. Hugdahl (1995) explains that electrodermal activity is produced when the skin conducts an electrical current. Electrical currents and “The principal invoked in the measurement of skin resistance or conductance is that of Ohm’s law, which states that skin resistance (R) is equal to the voltage (V) applied between two electrodes placed on the skin surface divided by the current (I) being passed through the skin; that is $R = V/I$ ” (Dawson et al., 2000, p. 204). The basic theory behind EDA was discovered by Féré in 1888, who “...found that, by passing a small electrical current across two electrodes placed on the surface of the skin, one could measure momentary decreases in skin resistance in response to a variety of stimuli” (Dawson et al., p. 200). For my experiment, we are looking more directly at skin conductance, rather than resistance. In this case, when

...the voltage is held constant then one can measure the current flow, which will vary directly with the reciprocal of skin resistance, skin *conductance*...skin conductance has been shown to be more linearly related to the number of active sweat glands and their rate of secretion. (Dawson et al., p. 204)

When using SCR equipment we are assessing the eccrine sweat glands, which are concentrated in the palms and fingers, to create this current. When measuring the electrodermal activity using the SCR equipment, there is a protocol for how to use and set up the equipment. I will expand on this process in Chapter Three. With this basic explanation of electrodermal activity, we can understand how this physiological measurement will enable us to empirically measure the magnitude of dissonance created based on the amount of sweat that is produced by the discomfort that develops through cognitive dissonance.

Educational Intervention:

For my study, the purpose of creating dissonance, as described previously, is to determine the role that dissonance plays in intensifying or diminishing prejudices. One measurement that can play a role in the diminishment of these implicit prejudices is an educational intervention. An educational intervention not only helps subjects reduce the dissonance, but it also teaches subjects why they should not hold prejudices, which may help diminish implicit prejudices.

Although I am looking at the role that cognitive dissonance plays in intensifying or diminishing prejudices, I am hoping to gain additional understanding for how an educational intervention will help diminish prejudices, especially after cognitive dissonance has been created. Educational interventions are good tools to use during a study about cognitive dissonance because people are likely to

...seek additional information pertaining to the issue or attitude object in order to resolve their inconsistency. As they gather additional information, their implicit and explicit attitudes may become more consistent as both are affected in the same way by the information (Gawronski & Bodenhausen, 2006; Whitfield & Jordan, 2009). (Jordan, Logel, Spencer, and Zanna, 2012, p. 214)

Educational interventions can take on a variety of forms, but they all have one thing in common: they send a message about a specific topic. When discussing educational interventions for prejudices, some interventions use contact with the target group, others use games and images that help subjects become aware of the discrimination, while others demonstrate specific information about the target group that is supposed to enlighten subjects about instances when people in the target group have acted in ways that conflict with prejudiced expectations that are held about the target group. All of these methods are used to encourage subjects to reduce their prejudices. The theory behind these interventions is that by becoming familiar with and aware of

the target group, subjects will begin to relate to and respect the group instead of holding onto previous prejudicial notions.

Connolly and Hosken (2006) conducted a pilot program aimed at promoting awareness of and respect for diversity among young children (ages 6 to 7). The pilot program used multiple methods of intervention, including short theatrical plays, workshops, and teacher-led classroom activities. The three main objectives of the program were to:

1. Increase children's ability to recognize, without prompting, instances of social exclusion;
2. Reduce children's tendency to stereotype others by increasing their awareness of the many different things that children share in common;
3. Increase children's willingness to be more inclusive of others who are different from themselves. (Connolly and Hosken, p. 111)

Connolly and Hosken created measurements to evaluate how effectively the intervention accomplished these three objectives. When evaluating the first objective, subjects "were asked to describe in their own words a photograph they were shown (see Figure 1) depicting a playground scene with three children playing together and a fourth child [who was expressionless] a little distance away looking on" (Connolly and Hosken, p. 113). Subjects who had received the intervention were more aware that the fourth child seemed to be excluded, than they had been before the intervention. When evaluating the second objective, subjects were asked to sort pictures of children into two groups of four. The idea behind this measurement was that subjects who had received the intervention would be likely to find more ways to sort these pictures that were not based on race, than they had before the intervention because they would be more aware of the similarities shown in the pictures. Connolly and Hosken found that subjects "...increased the number of times they could sort the photographs differently afterwards compared with before" (p. 116). When evaluating the third objective, subjects were asked to rate how happy they would be if they were friends with the child in the picture (there were eight photographs,

four with White children and four with Asian children). Unfortunately, "...there is no evidence that the pilot programme either had any effect on the white respondents' attitudes toward being friends with Asian children or on the Asian respondents' attitudes towards being friends with white children" (Connolly and Hosken, p. 119-120). Although the program did not affect the third objective, we can see that there was a significant creation of awareness among the subjects. Using educational interventions, regardless of the form, are likely to create some change in peoples' attitudes toward a target group because through the intervention, they become more aware of the similarities between themselves and the target groups. With this in mind, I developed an educational intervention (which I will explain further in Chapter Three) for my experiment that is more informational than interactive, but to my mind has the potential to reduce the implicit prejudices that subjects hold about the target group I observed.

The Prejudiced Attitude Regarding Height and Leadership:

After this discussion of the construction of my experiment, I finally arrive at the target attitude domain I am interested in investigating. As I mentioned in Chapter One I am focusing my experiment around the attitude domain of the belief in a positive correlation between height and leadership, based on the research by Blaker et al. (2013) that, "...height positively influences leadership perception for both men and women, though the effect is stronger for men" (p. 17). I chose this attitude domain based on a personal connection because I am 4'7" and am currently a recognized leader on my college campus. I hope that by using this attitude domain, I can gain a better understanding for how prevalent this prejudice is and hopefully have the opportunity to diminish this prejudice. Blaker et al. (2013) began their research about the connection between

height and leadership by examining the evolutionary development of leadership theory. Blaker et al. (2013) explain how,

According to evolutionary leadership theory (Spisak, Nicholson, & van Vugt, 2011; van Vugt 2006; van Vugt & Ahuja, 2010; van Vugt et al., 2008) leadership and followership are adaptive strategies which evolved because they facilitated the social coordination of ancestral groups and helped them achieve a wide range of reproductive goals such as hunting, group movement, group defense, and maintaining social cohesion. (p.18)

As the brain adapted to the expectation that a group was more successful when a leader was in charge, it became instinct and necessity to follow a leader. Blaker et al. (2013) explain that,

Given the physical risks involved [in leading a group, primarily to hunt food], early humans would have been looking for cues that these individuals would have been physically ‘fit to lead’; leadership has indeed been related to properties such as physical stamina, health, and energy in a number of studies. (pp. 18-19)

As height is a physical characteristic that was an advantage when hunting for food because it gave the hunter greater visibility, a dominating appearance, and is often associated with greater physical strength, we can understand why it became valued from an evolutionary standpoint.

Research has also shown that, “...people hold strong implicit beliefs, articulated in language, about the relationship between height and power (height terms such as up, high, super, top are cognitively associated with power)...Furthermore, the implicit association between physical size with dominance occurs at an early age” (Blaker et al., 2013, p. 19). Considering this examination of evolutionary and developmental associations between height and power or height and leadership, we can see how people might form automatic evaluations of a person’s leadership ability based on their height.

The study conducted by Blaker et al. (2013) furthers the previous research by asking subjects to directly evaluate the perceived leadership potential of tall versus short individuals. For this study, “Height was manipulated by using an imaging software to make the target appear 15 centimeters taller or shorter than the Dutch average male or female height” (Blaker et al.,

2013, p. 21). Subjects were placed in the short or tall condition and were asked to rate the target individual's leadership potential by rating how strongly they agreed or disagreed with the items, “‘*This person looks vital* [categorized to mean health, energy, and vigor],’ ‘*This person looks like a leader,*’ ‘*This person looks dominant,*’ and ‘*This person looks intelligent*’” (Blaker et al., 2013, p. 21). They found that the connection between height and leadership was influenced by gender.

Their results showed the following:

...there was a significant main effect of target gender on leadership perception, $F(1, 261) = 3.41$, $p = .033$, $\eta^2 = .01$, with male targets receiving higher ratings of leader perception than female targets. Also tall targets were rated significantly more leader-like than short targets, $F(1, 261) = 24.21$, $p < .001$, $\eta^2 = .08$. (Blaker et al., 2013, p. 22)

These results clearly demonstrate peoples' perception of leadership ability as correlated with height. This prejudice, one that people are often unaware they hold, that tall people are perceived to be better leaders, creates discrimination, whether directly or indirectly, against shorter people who are seeking leadership roles.

For my experiment, I am using this previous research to evaluate the role that cognitive dissonance plays in diminishing or intensifying the implicit prejudices that people have about height and leadership. I have combined the methods from the research that I have described above to create a procedure that I expect will give us insight into this question. I describe this procedure in detail in Chapter Three. Though my experiment is focused on height and leadership, I believe that the process I am using and the results I will obtain, will give insight for the understanding of how other prejudices are diminished or intensified through the creation of cognitive dissonance. The methods used in my experiment can be easily applied to other attitude domains. By using this experiment as a model for further research about the relationship between

cognitive dissonance and prejudice, there is a potential to determine how all prejudices are formed and how they can also be diminished.

CHAPTER THREE: METHODS AND PROCEDURE

Summary of Experiment: Hypotheses; Method: Recruiting of Subjects, Time-Period for the Experiment; PROCEDURE - Session One: Explicit Attitudes: Consent Form, Demographics Survey, Marlowe-Crowe Social Desirability Scale, Explicit Attitude Measurement, Initial Debrief; Session Two: Implicit Attitudes: Implicit Association Test, Analyzing the Implicit Association Test; Session Three: Dissonance Creation: Preparation for Skin Conductance Response Testing, Baseline, Creation and Assessment of Dissonance, Reduction of Dissonance, Current Implicit Attitude, Debrief Statement; Statistical Procedures

Summary of Experiment:

The purpose of my experiment is to determine the relationship between cognitive dissonance and prejudice, while focusing on the attitude domain of the association between height and leadership. Before I am able to measure the effect that cognitive dissonance has on the diminishment or intensification of this prejudice, I must produce cognitive dissonance within my subjects. One way to create this dissonance is to expose a dissonant relationship, specifically a dissonant relationship between explicit and implicit attitudes, that preexists within the subject. To extract this relationship, in Session One I tested for subjects' explicit attitudes about height and leadership, while examining their levels of social desirability, as this would enable me to determine which subjects would be likely to have explicit attitudes that reflect expected social norms, which would likely be discrepant from subjects' implicit attitudes. Once this process was used to narrow down the subjects, I tested for implicit attitudes in Session Two. In Session Three, subjects were shown their rate of discrepancy between their explicit and implicit attitudes. The dissonance produced by viewing this discrepant relationship was assessed using skin conductance response (SCR) equipment and a self-assessment of dissonance scale. All subjects completed a justification writing exercise to reduce the dissonance created and half of the subjects also received an educational intervention that would ideally diminish implicit

prejudices. Finally, I tested for subjects' current implicit attitudes to determine if the dissonance created had diminished or intensified the implicit prejudice.

In this chapter I describe the procedure and methods I used to conduct my experiment. I will describe in fuller detail my hypotheses, the process I used to recruit subjects, the importance of the time dimension of the experiment, Sessions One, Two, and Three, as well as which statistical procedures were used to analyze the data. I will then describe and analyze the results in Chapter Four.

Hypotheses. My hypotheses are focused on understanding the role that cognitive dissonance plays in intensifying or diminishing prejudices, specifically using the attitude toward height and leadership. I expect that after cognitive dissonance has been created, the educational intervention will diminish implicit prejudices toward height and leadership, while a nonintervention approach will either intensify the prejudices or the level of prejudice will remain the same. This being said, I will now state the eight hypotheses that I am hoping to explore through my experiment.

1. Subjects with a high discrepancy between their explicit and implicit attitudes, will have a high magnitude of dissonance as measured by the SCR equipment.
2. Subjects with a high discrepancy between their explicit and implicit attitudes will have a high averaged score on the self-assessment of dissonance scale.
3. Subjects with a high averaged score for the five statements that assess the discomfort created by viewing the discrepancy score and a low averaged score for the five statements that assess the current perception of the correlation between height and leadership on the self-assessment of dissonance scale, indicate a high magnitude of cognitive dissonance.

4. Subjects with a high magnitude of dissonance as measured by the SCR equipment, will also have a high magnitude of dissonance as measured by the self-assessment of dissonance scale.
5. Subjects with a high discrepancy between their explicit and implicit attitudes who receive the educational intervention, will diminish their implicit prejudices about height and leadership.
6. Subjects with a high discrepancy between their explicit and implicit attitudes who *do not* receive the educational intervention, will intensify their implicit prejudices or their level of prejudice will remain the same.
7. Subjects with a low discrepancy between their explicit and implicit attitudes who receive the educational intervention, will diminish their implicit prejudices about height and leadership.
8. Subjects with a low discrepancy between their explicit and implicit attitudes who *do not* receive the educational intervention, will intensify their implicit prejudices or their level of prejudice will remain the same.

Method:

Recruiting of Subjects. Recruiting subjects is an important process when conducting an experiment. Often, when conducting an experiment, an experimenter wants subjects with specific qualifications that will meet the criteria of the experiment. For my experiment, the main qualification was that subjects could not be familiar with me before the experiment began. When recruiting subjects, I first had to take in to consideration the fact that my height (4'7") and position as a leader on campus could possibly affect my results if my subjects knew me before the start of the experiment. As I was looking to see whether subjects held implicit prejudices about height and leadership, I assumed that my subjects who did not know me would be more

likely to hold such implicit prejudices, than a friend or someone who knew me from a leadership position who would be less likely to hold this implicit prejudice.

During the experiment, I accounted for the relationship between my height and my leadership position, as the experimenter, by remaining seated during Sessions One and Two. As Session Three involved moving into a different room, I could not remain seated for the entirety of this session, but believe that by keeping this experience consistent among all subjects and by not manipulating my height during the first two sessions by sitting on a stool, for example, I would be able to conduct the experiment without allowing my height to significantly effect the results. All subjects were college students at Bard College between the ages of 18 and 23. I recruited 40 subjects, mostly first year students and a few upper college students, who were on campus during the three weeks of Citizen Science. I recruited subjects through a variety of methods: I asked Peer Counselors to email their residents, I handed out flyers at registration for Citizen Science, I hung up flyers in the Campus Center, and I sat at a table in the Campus Center over a period of three hours and asked passerby if they wanted to participate. Subjects were told that the experiment would be completed in three sessions and that if they were asked to complete all three sessions, they would receive a total of \$15.⁴ (The recruitment flyer can be found in Appendix A.)

Time-Period for the Experiment. I intentionally conducted my experiment during a three week time-period because I wanted to ensure that if dissonance was somehow created during the Session One or Two that it would not be substantially reduced by Session Three. Although the structure of Session Three was developed to create cognitive dissonance regardless of the

⁴ I was able to pay my subjects \$15 for participating after receiving funding from the Bard College *Life Time Learning Institute*, which has a scholarship “Seniors to Seniors” where members of the Institute donate funding to Bard seniors who need help financing their Senior Projects.

previous sessions, it was important that the experiment did not cover an extended period. I constricted the period to prevent the possibility of decay of dissonance over a long period of time. As all of my subjects were college students, I conducted my experiment during a time-period, Citizen Science, when my subjects were not too busy with classes. This was specifically a concern because I needed to ensure that the subjects would return for all three sessions.

Procedure:

Session One: Explicit Attitudes

Consent Form. I recruited forty subjects for Session One. Upon arrival, subjects received a consent form, which explained what they would be doing during the experiment, the risks and benefits of participating, an emphasis on confidentiality of results, and the compensation they would receive for participating. The consent form was used to ensure that subjects were aware of the purpose of the experiment and their rights throughout the process. (The consent form can be found in Appendix B.)

Demographics Survey. After signing the consent form, subjects were asked to complete a demographics survey. The survey asks subjects their age to understand the age demographic because age can impact our relationships to authority figures and affect the variety of people in leadership positions subjects have met, solidifying their expectations for who should be in a leadership position. Ages ranged between 18 and 23, majority of the subjects were 18 or 19 years old. I asked them to state their sex, race, country born in, and country of permanent residence. This assesses how such demographics may influence their understanding of how someone's height relates to leadership ability. I looked at sex (male: 16; female: 24) because it has been shown that the association of height and leadership is found to be stronger among men and I

wanted to see if this would be true for my subjects as well. I expected that subjects whose race (White: 30; Black: 4; Latino: 3; Other: 2; Asian: 1), country born in (USA: 27; China: 1; Djibouti: 1; Germany: 1), or country of permanent residence (USA: 28; China: 1; Ethiopia: 1), may emphasize height as an important characteristic in leadership ability or tend to have tall people in that society, which would lead to stronger implicit prejudices. I asked subjects to tell me their height to observe how their personal height would impact their implicit prejudices, especially when comparing it to the other demographics (height ranged from 5'0" to 6'3"). Lastly, subjects told me whether they were a student leader on campus (No: 23; Yes: 7). For this question, I wanted not only to understand whether there was a correlation between the subjects' height and leadership involvement, but also to determine whether, if they themselves were a leader on campus, this would effect their expectations about other leaders. The correlations from the demographics survey are discussed in Chapter Five. (The full demographics survey can be found in Appendix D.)

Marlowe-Crowne Social Desirability Scale. Subjects were asked to complete the Marlowe-Crowne Social Desirability Scale (MC-SDS). As I explained in Chapter Two, I used this scale as a predictor variable to determine which subjects would be likely to have explicit attitudes that they believe would reflect the socially accepted attitude about the association between height and leadership, which would likely be discrepant with their implicit attitude about the association between height and leadership. In my experiment, I used the same scale that appears in Crowne and Marlowe's (1960) article, "A New Scale of Social Desirability Independent of Psychopathology." When analyzing the results for this measurement, I summed up the number of responses that were answered in the direction of social desirability, according to the answer key

made by Crowne and Marlowe. With a total of 33 items on the scale, a subject's score could have a possible range between 0 and 33. Subjects in my experiment had a range of scores between 5 and 23. The twenty subjects with a high social desirability score, in comparison to the rest of the subjects, were chosen to move on to the second session. These subjects had a social desirability score of 14 or higher. Based on these scores, I expected that these subjects would show a discrepancy between their explicit and implicit attitudes.

Explicit Attitude Measurement. I created the explicit attitude measurement, based on the Likert scaling procedure as described in "The Method of Constructing an Attitude Scale" (Likert, 1967). As described in Chapter Two, I had to be sure that all the items on my measurement were not confusing or repetitive and were balanced to ensure that there would not be a bias affect. Each item is rated on an odd-numbered scale, often 1-5. For example, subjects can respond to a statement by saying that they *strongly agree, agree, neutral/undecided, disagree, or strongly disagree* with the statement. After each item receives a score, it is possible to calculate the strength of a subject's attitude. I included a total of ten items that were arranged on a 5-point Likert scale, which asked subjects how strongly they agreed or disagreed with each statement. All items were statements about the relationship between height and different leadership traits. Five of the items used statements that indicated that height and leadership are correlated, for example "1. Tall people are better at commanding a presence than short people." The other five items used statements that indicated that height and leadership are not correlated, for example "2. Short people are just as intelligent as tall people." While developing this measurement, I developed a list of twenty-three items which stated both that height and leadership were and were not correlated. This list was narrowed down to the ten item measurement I used in my

experiment. I narrowed down the list based on repetitiveness and strength of the item. Strength, meaning how strong an effect I believed the statement would have in assessing the subject's explicit attitude.

Listed below are general statements of belief. Read each item and decide how you feel about the statement. Please only circle one answer per question indicating how strongly you agree or disagree with the statement.

- | | | | | | |
|---|----------------|-------|---------|----------|-------------------|
| 1. Tall people are better at commanding a presence than short people. | Strongly Agree | Agree | Neutral | Disagree | Strongly Disagree |
| 2. Short people are just as intelligent as tall people. | Strongly Agree | Agree | Neutral | Disagree | Strongly Disagree |
| 3. Tall people are more likely to be listened to and respected than short people. | Strongly Agree | Agree | Neutral | Disagree | Strongly Disagree |
| 4. Tall people are more assertive than short people. | Strongly Agree | Agree | Neutral | Disagree | Strongly Disagree |
| 5. Short people are just as likely to be respected leaders of a group as tall people. | Strongly Agree | Agree | Neutral | Disagree | Strongly Disagree |
| 6. Tall people are more confident leaders than short people. | Strongly Agree | Agree | Neutral | Disagree | Strongly Disagree |
| 7. Short people can just as effectively gain the attention of a large group as tall people. | Strongly Agree | Agree | Neutral | Disagree | Strongly Disagree |
| 8. Tall people are more effective at leading a group than short people. | Strongly Agree | Agree | Neutral | Disagree | Strongly Disagree |
| 9. Short people are just as ambitious as tall people. | Strongly Agree | Agree | Neutral | Disagree | Strongly Disagree |
| 10. Short people are just as likely to have a dominating presence as tall people. | Strongly Agree | Agree | Neutral | Disagree | Strongly Disagree |

Figure 1. Explicit Attitude Scale. Based on the Likert scaling procedure.

I calculated the scores for the explicit attitudes by assigning each point on the scale a number. For items where height and leadership were correlated, *strongly agree* received a score of 5 and *strongly disagree* received a score of 1. For items where height and leadership were not

correlated, *strongly agree* received a score of 1 and *strongly disagree* received a score of 5. This scoring model created a balancing effect. Thus, a subject with a strong explicit attitude that height and leadership are correlated, could receive a maximum score of 50, while a subject with a strong explicit attitude that height and leadership are not correlated could receive a minimum score 10. Subjects in my experiment received explicit attitude scores that ranged between 12 and 36.

As explained in the previous section, the twenty subjects with the highest scores on the social desirability scale were asked to continue to the second session. Originally, I wanted subjects with high scores on the MC-SDS and strong explicit attitudes, ten subjects with a strong explicit attitude that height and leadership were correlated and the other ten subjects with a strong explicit attitude that height and leadership were not correlated. I expected that subjects who had high scores on the MC-SDS and strong explicit attitudes that height and leadership were correlated would have implicit attitudes that height and leadership were not correlated, while subjects who had high scores on the MC-SDS and strong explicit attitudes that height and leadership were not correlated would have implicit attitudes that height and leadership were correlated. This is based on the understanding that their explicit attitudes would reflect their expectations of what attitude should be socially desirable or socially acceptable, while their implicit attitudes would be discrepant and reflect their automatic evaluations about the attitude domain of the association between height and leadership. After calculating the scores for subjects' explicit attitudes and finding that the range of explicit attitude scores for subjects, who also received high scores on the MC-SDS, was evenly dispersed between 12 and 36, instead of a more distinct split among subjects' explicit attitudes between 10 and 50, I determined that I

would continue with my experiment and observe the relationship between social desirability as a predictor of the discrepancy between explicit and implicit attitudes with this more cohesive range, rather than focusing on a distinct split between subjects' explicit attitudes as described above.

Initial Debrief. This first session of the experiment took approximately fifteen minutes to complete. Upon completion, I explained to the subjects that I would be contacting them soon to inform them about whether they would be asked to return and complete the experiment. I promised that all subjects who were not asked to return would receive a full debrief statement after the experiment had been completed.⁵ All subjects received \$3 as compensation for completing Session One.

Session Two: Implicit Attitudes

Implicit Association Test. As described in Chapter Two, I used the paper-format Implicit Association Test (IAT) to assess my subjects' implicit attitudes. The IAT can be adapted and used to assess any attitude domain. When adapting the IAT to fit with the particular attitude toward the association of height and leadership, I referred to the article by Lemm et al. (2008), "Assessing Implicit Cognitions with a Paper-Format Implicit Association Test." Lemm et al. explained that when creating a paper-format IAT, the attitude domain should be divided into four categories. When discussing the attitude domain of height and leadership, we take both concepts of the attitude domain and use the different categories that are present. Height is divided in two categories: short and tall; and leadership is divided in two categories: leadership and non-

⁵ As this campus is small and most of my subjects were first year students who likely knew each other, I waited until the experiment was completed to explain the entirety of the experiment to the subjects who were not asked to return, to ensure that this debrief statement would not compromise the validity or success of my experiment because subjects who were asked to return could have been informed of the finer details of my experiment.

leadership characteristics. Five stimulus items are then used to represent these four categories (Tall: Lanky, Big, Large, Gigantic, Towering; Short: Small, Tiny, Little, Petite, Squat; Leadership Characteristics: Respectable, Effective, Intelligent, Assertive, Confident; Non-Leadership Characteristics: Submissive, Ineffective, Disreputable, Unintelligent, Unambitious). For the test, these twenty stimulus items are listed twice over two columns on a page or block. Both columns have all twenty words listed, but are in different orders. On this first page, at the top of both columns, the categories are paired and listed above the circle where subjects are instructed to mark the correct category for the specific word (Short + Non-Leadership are paired on one side of the column, while Tall + Leadership are paired on the other). Subjects are given 20 seconds to complete the block by marking the circles under the paired categories to indicate that the stimulus item belongs to that specific category, meaning they have half-a-second to register and categorize each item if they were to complete the entire block. This forces subjects to automatically evaluate the stimulus items, rather than rationalize the categorization of each item. After completing the first block, subjects complete the same task on a second block that has switched the placement of the categories that are at the top of the column (Short + Leadership are now paired on one side and Tall + Non-Leadership are paired on the other). By comparing subjects responses to both of these blocks, where subjects have automatically evaluated the stimulus items, we are able to observe their implicit attitudes about the attitude domain.

When distributing the IAT to my subjects, I made sure that I counterbalanced the test, meaning, that ten subjects received an IAT where the first block paired Short + Non-leadership and the second block paired Short + Leadership, while the other ten subjects received an IAT where the first block paired Short + Leadership and the second block paired Short + Non-

leadership. By counterbalancing the tests, I was able to ensure that the results from the IAT were based on the subjects' implicit attitudes, instead of on the subjects' familiarity with the testing procedure, which may make it easier for them to categorize the stimulus items in the second block regardless of the category pairings at the top of the column.

Short Non-Leadership		Tall Leadership	Short Non-Leadership		Tall Leadership
<input type="radio"/>	small	<input type="radio"/>	<input type="radio"/>	large	<input type="radio"/>
<input type="radio"/>	respectable	<input type="radio"/>	<input type="radio"/>	unintelligent	<input type="radio"/>
<input type="radio"/>	lanky	<input type="radio"/>	<input type="radio"/>	petite	<input type="radio"/>
<input type="radio"/>	submissive	<input type="radio"/>	<input type="radio"/>	confident	<input type="radio"/>
<input type="radio"/>	big	<input type="radio"/>	<input type="radio"/>	lanky	<input type="radio"/>
<input type="radio"/>	ineffective	<input type="radio"/>	<input type="radio"/>	disreputable	<input type="radio"/>
<input type="radio"/>	tiny	<input type="radio"/>	<input type="radio"/>	tiny	<input type="radio"/>
<input type="radio"/>	intelligent	<input type="radio"/>	<input type="radio"/>	assertive	<input type="radio"/>
<input type="radio"/>	large	<input type="radio"/>	<input type="radio"/>	squat	<input type="radio"/>
<input type="radio"/>	assertive	<input type="radio"/>	<input type="radio"/>	ineffective	<input type="radio"/>
<input type="radio"/>	little	<input type="radio"/>	<input type="radio"/>	gigantic	<input type="radio"/>
<input type="radio"/>	disreputable	<input type="radio"/>	<input type="radio"/>	intelligent	<input type="radio"/>
<input type="radio"/>	gigantic	<input type="radio"/>	<input type="radio"/>	big	<input type="radio"/>
<input type="radio"/>	unintelligent	<input type="radio"/>	<input type="radio"/>	submissive	<input type="radio"/>
<input type="radio"/>	petite	<input type="radio"/>	<input type="radio"/>	small	<input type="radio"/>
<input type="radio"/>	confident	<input type="radio"/>	<input type="radio"/>	respectable	<input type="radio"/>
<input type="radio"/>	towering	<input type="radio"/>	<input type="radio"/>	towering	<input type="radio"/>
<input type="radio"/>	effective	<input type="radio"/>	<input type="radio"/>	unambitious	<input type="radio"/>
<input type="radio"/>	squat	<input type="radio"/>	<input type="radio"/>	little	<input type="radio"/>
<input type="radio"/>	unambitious	<input type="radio"/>	<input type="radio"/>	effective	<input type="radio"/>

Figure 2. Implicit Association Test: Short + Non-Leadership block.

I developed the stimulus items for the IAT, by referring to Nosek's (2005) article, "Moderators of the Relationship Between Implicit and Explicit Evaluation." In his appendix, he included a list of categories and stimulus items that could be used for the IAT. For the category *Short People*, he used the stimulus items: small, tiny, little, slight, and petite. For the category *Tall People*, he used the stimulus items: lanky, big, large, gigantic, towering. I decided to adapt these to my IAT, but instead of using "slight" in the *Short People* category, I used squat because I felt that it is a more modern and common descriptor of short people than slight. As Nosek did not have a list of stimulus items for categories about *Leadership* or *Non-Leadership* characteristics, I developed the items through word searches on google and by asking friends for words that are associated with leadership and non-leadership characteristics. When developing the stimulus items for the *Leadership* and *Non-Leadership* categories, I went through twelve leadership characteristics for both categories to determine which five stimulus items would be most effective. For the category of *Leadership Characteristics*, I used respectable, effective, intelligent, and assertive. For the category of *Non-Leadership Characteristics*, I used submissive, ineffective, disreputable, unintelligent, and unambitious. Before subjects began categorizing the stimulus items in the blocks, I showed them the stimulus items and the categories to which they belonged, so subjects would be prepared to categorize the words when they began the test.

Analyzing the Implicit Association Test. When analyzing the results from the IAT, I followed the instructions by Lemm et al. (2008). After much evaluation, Lemm et al. decided that the best procedure to score the paper-format IAT is to find a product that is the square root of the difference. Lemm et al. describe this procedure in detail explaining,

This approach includes both difference score and ratio information. In this case, the square root of the difference between the number of items completed between the two blocks is multiplied by the ratio of the items completed. It is calculated as $(X/Y) \times \text{Square Root of } (X-Y)$, where X is the

greater of A or B, and Y is the smaller of A or B. If B is greater than A, the resulting values are multiplied by -1 to retain directionality of the IAT effect. (p. 129)

A and B indicate attitudinal pairings based on the block, for my experiment Tall + Leadership are block A and Short + Leadership are block B. This meant that all subjects with a positive score had categorized more stimulus items correctly in the Tall + Leadership block and that all subjects with a negative score had categorized more stimulus items correctly in the Short + Leadership block. The range of scores for my subjects was between -1.885 and 10.198. For my experiment, I designated the ten subjects with an IAT score between -1.885 and 2.8 as having low implicit prejudices toward the correlation between height and leadership, while the ten subjects with an IAT score between 3.6 and 10.198 were designated as having high implicit prejudices. I determined this split based on the understanding that subjects with IAT scores close to or below zero should have lower implicit prejudices than subjects with IAT scores higher than zero. Since I wanted to have an even number of subjects to compare the results, I divided the subjects into these two groups, half with low implicit prejudices and half with high implicit prejudices based on how close their scores were to zero. This session took approximately 5 minutes to complete. All subjects in Session Two were compensated \$5 for their participation and were asked to return for Session Three.

Session Three: Dissonance Creation

Preparation for Skin Conductance Response Testing. When subjects returned for Session Three, I prepared them for the test, which uses the skin conductance response (SCR) equipment. As the equipment assesses SCR through electrodermal activity (EDA), as described in Chapter Two, I needed to ensure that the equipment would be able to register the EDA produced by my experimental measurements, so I could assess the amplitude of dissonance created. Before I

could connect subjects to the equipment, I asked them to wash their hands using *Softsoap Liquid Hand Soap*. I asked my subjects to wash their hands to ensure that all subjects would have the same level of natural conductive properties of the skin, based on the explanation and recommendation by Dawson et al. (2000), that since,

...a fall in conductance has been noted following the use of soap and water and since the length of time since the last wash will be a variable across the subjects when they arrive at the laboratory, these authors recommended that subjects be asked to wash their hands with a nonabrasive soap prior to having the electrodes attached. (p. 206)

Although *Ivory Soap* is usually recommended as an oil-free soap, I used this *Softsoap* brand because it was also oil free and did not contain alcohol, making it nonabrasive.

After washing their hands, subjects were connected to the equipment that would measure SCR. This equipment was *Biopac System MP35*. To measure the results, I used the *Biopac Student Lab* program, *Lesson 09: GSR & Polygraph*. When connecting subjects to this equipment, I used electrode strips, specifically *Biopac EL507 EDA (Isotonic Gel) Electrode*. These strips hold isotonic gel that is made of silver-silver chloride because these electrodes "... minimize the development of bias potentials and polarization...[The electrode strips] control the size of the skin area that comes in contact with the electrode paste" (Dawson et al., 2000, p. 205). Dawson et al. explain that the placement of the two strips, which will create a circuit to record the EDA produced, could be on the volar surfaces of the medial phalanges, volar surfaces of the distal phalanges, and thenar and hypothenar eminences of the palms. As explained in Chapter Two, these locations are used to assess EDA because they have high concentrations of eccrine sweat glands. I chose to place the electrode strips on the volar surfaces of the medial phalanges for the index and middle finger on all of my subjects' left hands. I kept the placement of the electrode strips, as well as the placement of the wires which connected the strips to the

equipment (black wire on index finger and red wire on middle finger), consistent to ensure that this would not be a confounding variable throughout the process.

Baseline. After attaching subjects to the equipment, I waited five minutes before starting the recording to ensure that all data collected would be based on the results from my measurements and not due to any physical exertion that was made in the process of getting to the lab. I also asked my subjects to keep their left hand still when I was recording because finger movements can cause a spike in the recordings. After calibrating the equipment, I was ready to begin the baseline recording.

For my baseline recording, I wanted my subjects to complete a task that would induce little to no emotional response. I asked my subjects to read out loud twenty nonsense syllables that I had developed. These syllables were based on the understanding of the nonsense syllables used by Hermann Ebbinghaus for his memory task, where he attempted to learn and recall the syllables to develop an understanding of memory. These syllables were all consonant-vowel-consonant combinations. I did not require my subjects to attempt to memorize the syllables, but I wanted to use these types of syllables because they did not have and would not invoke any prior meaning or emotion. Some of the syllables I used were Bih, Mef, and Naj. This recording acted as a neutral session which I could use to compare to the following recordings. (The full list of syllables read for the baseline level of arousal task can be found in Appendix F.)

Creation and Assessment of Dissonance. As I have explained in Chapter Two, I attempted to create cognitive dissonance in my subjects by showing them the discrepancy between their explicit and implicit attitudes. To do this, I showed them an image of their discrepancy score with the heading *Rate of Discrepancy in YOUR Public and Private Attitudes about Height and*

Leadership. As subjects may not be as familiar with the meaning of explicit and implicit attitudes, I equated public to explicit and private to implicit attitudes to ensure that my subjects would fully understand that their results represented a discrepancy between these two types of attitudes about the association between height and leadership. I chose public and private to represent explicit and implicit because explicit attitudes are attitudes someone is aware they hold and demonstrate as their *public* opinion, while implicit attitudes are attitudes someone is unaware they hold so these attitudes are often only seen in one's *private* life. The score was non-numerical and listed *Low Discrepancy* on one end and *High Discrepancy* on the other. The subjects' rate of discrepancy was indicated by how full the score was and an arrow which indicated and emphasized this point.

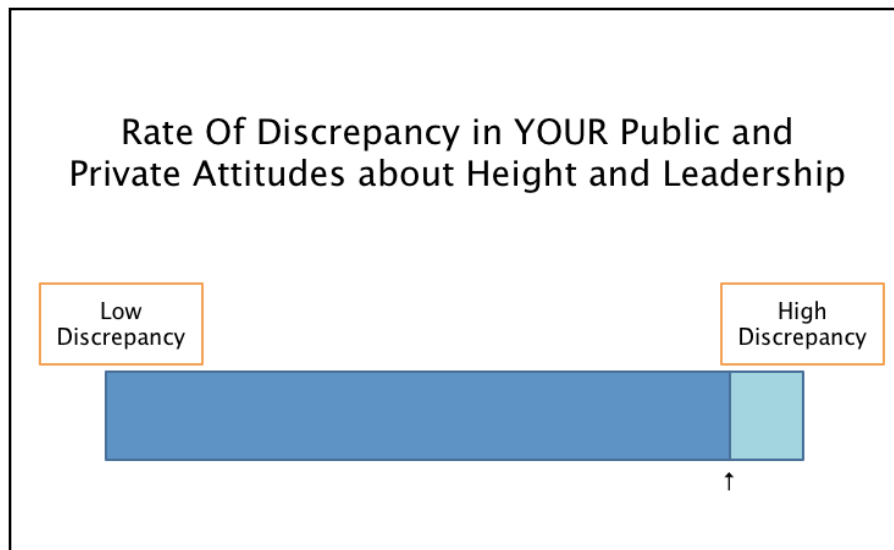


Figure 3. Discrepancy Score.

I determined the rate of discrepancy based on subjects' scores from the explicit and implicit attitude test. Subjects with explicit attitudes that height and leadership were not correlated and implicit attitudes that height and leadership were correlated, were placed in the High Discrepancy condition, while subjects with explicit attitudes and implicit attitudes that height

and leadership were not correlated, were placed in the Low Discrepancy condition. I recorded my subjects' responses using the SCR equipment, while explaining that,

Based on the calculations from your results in the first two sessions, this score indicates the rate of discrepancy between your public/conscious and private/unconscious attitudes about the association between height and leadership. Your rate of discrepancy was high (or low) for all of the subjects in this study. This means that your public attitude about whether someone's leadership ability is dependent on their height is inconsistent (or consistent) with your private attitude about whether someone's leadership ability is dependent on their height.

After recording my subjects response to this statement, I stopped recording and asked my subjects to complete a self-assessment of dissonance scale which examined the discomfort produced by viewing the discrepancy and the current perception of the correlation between height and leadership. Both parts of this scale were used to indicate that cognitive dissonance was created.

I used a self-assessment of dissonance scale to determine whether there is a distinct difference between the physiological response and the self-perception of the dissonance created by the discrepancy between subjects' explicit and implicit attitudes. To assess the dissonance created and current perception of the correlation between height and leadership, I asked subjects to rate how strongly they agreed or disagreed with the statement by marking a vertical line along a 10 cm horizontal line. I had five items to assess the discomfort created by viewing the discrepancy and five items to assess the perception of the correlation between height and leadership. To assess the discomfort created, subjects responded to statements such as, "1. My test results accurately describe my attitude toward height and leadership; 3. After seeing my test results, I feel disappointed by my attitude toward height and leadership." For the assessment of the current perception of the correlation between height and leadership, subjects responded to statements such as, "6. A person's height reflects their leadership ability; 8. A leader is not

defined by their height.” I calculated the results for the self-assessment scale by measuring the distance between the end of the line and the subject’s mark, while considering directionality to indicate a consistent high or low score based on the discomfort created and the current perception of the correlation between height and leadership.

Listed below are statements regarding your reaction to your test results and your current attitude toward height and leadership. Read each item and decide how you feel about the statement. Please mark the point along the line indicating how strongly you agree or disagree with the statement.

1. My test results accurately describe my attitude toward height and leadership.
 Strongly Agree -----Strongly Disagree
2. After seeing my test results, I feel confused
 Strongly Agree -----Strongly Disagree
3. After seeing my test results, I feel disappointed by my attitude toward height and leadership.
 Strongly Agree -----Strongly Disagree
4. After seeing my test results, I want to change my attitude.
 Strongly Agree -----Strongly Disagree
5. I feel that my test results were incorrectly calculated.
 Strongly Agree -----Strongly Disagree
6. A person’s height reflect’s their leadership ability.
 Strongly Agree -----Strongly Disagree
7. When I think about a leader, I always expect them to be tall.
 Strongly Agree -----Strongly Disagree
8. A leader is not defined by their height.
 Strongly Agree -----Strongly Disagree
9. A leader’s effectiveness is not based on their height.
 Strongly Agree -----Strongly Disagree
10. Ideals, rather than height enable a leader to succeed.
 Strongly Agree -----Strongly Disagree

Figure 4. Self-Assessment of Dissonance Scale.

Subjects with a high averaged score on the statements assessing the discomfort created indicated a high level of cognitive dissonance or discomfort created by viewing the discrepancy score. I developed the items in this part of the assessment, with the expectation that subjects who were experiencing high levels of discomfort would likely be confused by their test results, think that something was calculated incorrectly, and want to change their results, leading to a change in attitude. A low averaged score for the statements assessing the current perception of the correlation between height and leadership indicates that the subject does not correlate height with leadership ability. I expect that if the averaged score for the discomfort created is high and the averaged score for the current perception of the correlation between height and leadership is low, this will indicate that the subject is attempting to dismiss the high discrepancy that was shown in the discrepancy score. Meaning, I expect that the subject is attempting to adjust his attitude to prove that the discrepancy is wrong by stating confusion about the test scores and emphasizing how there could not be a discrepancy because they do not hold the attitude that height and leadership are correlated, thus showing that dissonance was created. The self-assessment scale depicts this relationship between the discomfort created and the current perception of the correlation between height and leadership, to create a scaling measurement that assesses the amount of dissonance created. I also expect that a subject with a high score on the self-assessment scale will have a high amplitude of arousal as recorded during the discrepancy feedback period using the SCR equipment, indicating the creation of dissonance. For this experiment, the discrepancy between the explicit and implicit attitudes acts as the independent variable, while the magnitude of dissonance as measured on the SCR equipment and self-assessment scale acts as the dependent variable.

Reduction of Dissonance. After assessing the magnitude of dissonance created, I asked all subjects to write a brief response to why they believed that the results assessing their explicit attitudes were consistent or inconsistent with the results assessing their implicit attitudes. I used this exercise to give my subjects the opportunity to justify the discrepancy and help reduce any dissonance and discomfort that was created. After dissonance has been reduced, it is possible to determine whether a subject has intensified or diminished their original attitude. (The justification writing exercise can be found in Appendix G.)

I also used the educational intervention as a way to help reduce dissonance, along with using it as a tool to reduce implicit prejudices. Ten out of the twenty subjects were given the education intervention, five from the high discrepancy group and five from the low discrepancy group. I developed the educational intervention by researching *short world leaders* on the internet. I looked for world leaders whose heights' were below the current average in the United States, for men this is 5'9" and for women this is 5'4". I chose fifteen world leaders who were alive between the 18th Century and now: some politicians, some activists and some intellectuals. Some who are still revered today and others who were respected in their time, but are seen now as wrongdoers. This array of world leaders have all commanded the acclaim of being strong leaders who others followed and supported, regardless of their height. The educational intervention asks subjects to read aloud the name, description, and height of the world leaders. An example of one of the descriptions is, "4. Harriet Tubman was one of the most famous 'conductors' on the underground railroad, helping hundreds of slaves obtain freedom in the Northern states. She risked her own life to save numerous others. Her height was 5'0"." This educational intervention gave subjects the opportunity to learn about world leaders whose height

did not prevent them from being respected or taking on strong leadership roles in their communities. (The full educational intervention can be found in Appendix H.)

After subjects completed the self-justification writing exercise or the educational intervention, depending on which condition they were assigned, I recorded the current level of EDA being produced. This recording assesses the current physiological level of dissonance being produced, which I expect would be low as the previous measurement or measurements were used to reduce this dissonance. It is necessary to understand whether dissonance has been reduced because only when dissonance is reduced is there likely to be a change in the attitude, whether that means the attitude was intensified or diminished. We will be able to see this attitude change by assessing subjects implicit attitudes after dissonance has been created and reduced, which will be described below. When recording the reduction in dissonance, I asked subjects to look at a black screen and sit still while I recorded their responses for approximately 34 seconds.

Current Implicit Attitude. After I recorded the current EDA for each subject, I had them complete a second Implicit Association Test. This IAT was identical to the one used in Session Two and was also counterbalanced. I used this second IAT to determine whether the dissonance created in this session would intensify or diminish the implicit prejudice observed through the first IAT in Session Two. I expect that if subjects receive the educational intervention, they will have lower scores on the second IAT than on the first IAT. This lower score on the second IAT indicates a diminishment in the prejudice that height and leadership are correlated. The second IAT completed the experimental portion of this study.

Debrief Statement. After completing the second IAT and removing the electrode strips, I explained to the subject the greater purpose of the experiment through a debrief statement. The

debrief statement explained my research question, what I was hoping to find, explained that any discomfort they were experiencing would ease over time, and that if there was a high discrepancy between their explicit and implicit attitudes it was likely due to societal influences. This statement gives the subjects a better understanding of what occurred during the experiment and reduces any discomfort they experienced during the process. All subjects received \$7 as compensation for completing Session Three. This meant that they received a total of \$15 throughout the study. (The debrief statement can be found in Appendix C.)

Analysis of Data from Physiological Recordings. To analyze the data recorded by the SCR equipment, I first examined the three recordings for each subject to determine if the data recorded was sufficient to analyze. Data for four subjects was insufficient because these recordings did not show significant electrodermal activity⁶. After removing these subjects, I analyzed the data recorded for the remaining sixteen subjects. For the baseline, discrepancy feedback, and dissonance reduction recordings, I extracted the maximum and minimum amplitudes recorded and the differences in the maximum and minimum amplitudes or the peak-to-peak recordings. These measurements enabled me to determine the amount of electrodermal activity produced at the different times throughout this session. I kept the change in time for the recordings consistent within the three recordings, baseline (15 seconds), discrepancy feedback (42.52), and dissonance reduction (34 seconds). The change in time was based on the average time it took subjects to complete each session. With this data, I am able to analyze the

⁶ The lack of significant recordings was likely due to the electrode strips that were used when recording these subjects' responses to the measurements. When recording these four subjects, I was using old and dryer electrode strips and did not receive the new electrode strips until after recording these four subjects. (When recording data for the other 16 subjects, I used the new electrode strips. I had not waited for the new electrode strips before running these first four subjects, because I was concerned about the time-frame of my experiment and was unsure about when the new electrode strips would arrive.)

relationship between these recordings and other measurements throughout my experiment to determine whether I was able to measure the magnitude of dissonance created by my experiment.

Statistical Procedures:

When analyzing the data produced from this experiment, I used the following statistical measurements. I used analyses of covariance (ANCOVA) to analyze two effects, 1. The effect of subjects viewing the rate of discrepancy between their explicit and implicit attitudes on the maximum amplitude of dissonance produced during the discrepancy feedback period; 2. The effect of the maximum amplitude of dissonance produced during the discrepancy feedback period on the differences in the Implicit Association Tests. I used one-way analyses of variance (one-way ANOVA) to analyze two effects, 1. The effect of subjects viewing the rate of discrepancy between their explicit and implicit attitudes on the dissonance produced as evaluated by self-assessment of dissonance scale; 2. The effect of the “educational intervention” on the differences in the Implicit Association Tests. And I used correlations to analyze two relationships, 1. To look specifically at the relationship between the maximum amplitude of dissonance on the SCR created during the discrepancy feedback period and the averaged score for the five statements that assess the discomfort created by viewing the discrepancy via the self-assessment of dissonance scale; 2. The relationship between the differences in the IATs and the self-assessment of dissonance. The results from these statistical measurements will be analyzed in Chapter Four and discussed in Chapter Five.

CHAPTER FOUR: RESULTS

Expectations for Results: Hypotheses; Results: Relationship between Discrepancy Scale and Evidence for Cognitive Dissonance, Relationship between the Two Measures of Cognitive Dissonance, Relationship between the Differences in the Implicit Association Tests and the Presence of Cognitive Dissonance, Effect of the “Educational Intervention” on the Differences in the Implicit Association Tests; Implication of Results

Expectations for Results:

As explained in Chapter Three, I attempt to assess a variety of relationships in my experiment. Primarily, I am examining the effect of viewing a score that shows the rate of discrepancy between a subject’s explicit and implicit attitudes on the production of cognitive dissonance. Meaning, I am attempting to determine if a subject who views a representation of the discrepant relationship of their attitudes will cognitively internalize this inconsistency, which means that cognitive dissonance has been produced. As I have also explained, I used two dependent instruments to assess the dissonance created, the first is the skin conductance response (SCR) equipment. This instrument evaluates the electrodermal activity created to determine how much moisture or sweat has been produced when the subjects react to their discrepancy score, indicating a physiological response to the dissonance created. The SCR equipment has been used in the past to measure magnitude of dissonance. Past research by Croyle & Cooper (1983) and Elkin & Leippe (1986) used this equipment to attempt to measure the magnitude of dissonance created when subjects completed counter-attitudinal essays. Their results show a measure of arousal, but the arousal is unlikely a result of dissonance, as discussed in Chapter Two. However, by using this equipment it is still possible to measure arousal created by cognitive dissonance, which is why I wanted to use it in my experiment. The second measure is the self-assessment of dissonance scale based on the Likert scaling procedure that consists of two sections, the first five

statements assessed the discomfort created by viewing the discrepancy between the subjects' explicit and implicit attitudes, while the second five statements assessed subjects' current explicit attitude about height and leadership. The scale works together to assess the dissonance created when a subject receives a high averaged score for the five statements assessing the discomfort created and when they also receive a low averaged score for the five statements that assess subjects' current explicit attitude. This measurement is shown in Chapter Three. Through these measures, I attempt to evaluate the relationship between the dissonance produced and the diminishment of implicit prejudices, as indicated by the difference between the subjects' scores on the Implicit Association Test (IAT) in Session Two and their scores on the IAT in Session Three. Secondly, I want to use the difference between these two IAT scores to evaluate the relationship between the educational intervention and the diminishment of implicit prejudices.

Hypotheses. The relationships I expect to find through statistical testing are:

1. Subjects with a high discrepancy between their explicit and implicit attitudes will have a high magnitude of dissonance as measured by the SCR.
2. Subjects with a high discrepancy between their explicit and implicit attitudes will have a high averaged score on the self-assessment of dissonance scale.
3. Subjects with a high averaged score for the five statements that assess the discomfort created by viewing the discrepancy score and a low averaged score for the five statements that assess the current perception of the correlation between height and leadership on the self-assessment scale, indicate a high magnitude of cognitive dissonance.
4. Subjects with a high magnitude of dissonance as measured by the SCR, will also have a high magnitude of dissonance as measured by the self-assessment of dissonance scale.

5. Subjects with a high discrepancy between their explicit and implicit attitudes who receive the educational intervention, will diminish their implicit prejudices about height and leadership.
6. Subjects with a high discrepancy between their explicit and implicit attitudes who *do not* receive the educational intervention, will intensify their implicit prejudices or their level of prejudice will remain the same.
7. Subjects with a low discrepancy between their explicit and implicit attitudes who receive the educational intervention, will diminish their implicit prejudices about height and leadership.
8. Subjects with a low discrepancy between their explicit and implicit attitudes who *do not* receive the educational intervention, will intensify their implicit prejudices or their level of prejudice will remain the same.

Results:

Relationship between Discrepancy Score and Evidence for Cognitive Dissonance. I examined the potential effect of subjects viewing the rate of discrepancy between their explicit and implicit attitudes on the maximum amplitude of dissonance produced during the discrepancy feedback period, but found that there was no effect on these variables.⁷ (The discrepancy feedback period, was the time-period when subjects viewed their discrepancy rate and I simultaneously recorded their skin conductance response using the SCR equipment.) This indicates that there was no effect of viewing the discrepancy between explicit and implicit attitudes on the production of electrodermal activity (EDA) that would indicate the magnitude of dissonance produced as assessed by the SCR equipment.

⁷ As mentioned in Chapter Three, when evaluating this relationship, I only used sixteen subjects because four of the subjects did not have recordings on the SCR equipment that indicated significant electrodermal activity. As mentioned before, the lack of significant recordings was likely due to the old electrode strips that were used when recording these four subjects' responses to the measurements.

I used a one-way analysis of variance (one-way ANOVA) to determine the effect of subjects viewing the rate of discrepancy between their explicit and implicit attitudes on the dissonance produced as evaluated by the self-assessment of dissonance scale. For these statistical measurements, I included all twenty subjects. I examined the averaged score of the entire self-assessment of dissonance (meaning the averaged score of all ten statements), the averaged score of the first five statements, which assessed the discomfort created after subjects saw the discrepancy rate, and the averaged score of the second five statements, which assessed subjects' current explicit attitudes about height and leadership. The discrepancy rate was split into two groups, high and low discrepancy between explicit and implicit attitudes. There is a significant effect of the subjects viewing the rate of discrepancy between their explicit and implicit attitudes on the dissonance produced as evaluated by the averaged score of the entire self-assessment of dissonance, $F(1,18) = 10.16, p < .01$. After splitting the self-assessment scale into the two sections, there was a significant effect of viewing the rate of discrepancy on the dissonance produced as evaluated by the averaged score of the five statements assessing the discomfort created, $F(1,18) = 39.63, p < .01$, but there was not a significant effect of viewing the rate of discrepancy on the dissonance produced as evaluated by the averaged score of the five statements assessing subjects' current explicit attitudes, $F(1,18) = 0.35$. As there is a significant effect of a subject experiencing discomfort after viewing the rate of discrepancy as evaluated by the averaged score of these five statements on the self-assessment of dissonance scale, this indicates that the five statements assessing the discomfort created were a more robust measurement of dissonance, than the five statements assessing subjects' current explicit attitudes.

Table 1

Effect of the Discrepancy Score on the Self-Assessment of Dissonance Scale

Section of Self-Assessment of Dissonance Measurement	Grand Mean	F
Averaged Score for the First Five Statements	3.5	39.63
Averaged Score for the Second Five Statements	1.57	0.35
Averaged Score for the Entire Measurement	2.54	10.16

Relationship between the Two Measures of Cognitive Dissonance. When evaluating the relationship between the two measures of cognitive dissonance, I used a correlation to look specifically at the relationship between the maximum amplitude of dissonance on the SCR created during the discrepancy feedback period and the averaged score for the five statements that assess the discomfort created by viewing the discrepancy via the self-assessment of dissonance scale. Again, I only used the sixteen subjects who had valid scores on their results for the SCR equipment. The correlation between the maximum amplitude and the averaged score for the five statements that assess the discomfort created was $-.143$, which was not statistically significant ($p > .05$). This indicates that there was no relationship between the dissonance assessed by the SCR equipment and the dissonance assessed by the first five statements on the self-assessment of dissonance.

Relationship between the Differences in the Implicit Association Tests and the Presence of Cognitive Dissonance. I examined the potential effect of the maximum amplitude of dissonance produced during the discrepancy feedback period on the differences in the Implicit Association Tests, but found that there was no effect. For this measurement I again only used the sixteen

subjects who had valid scores on their results for the SCR equipment. This indicates that there was no effect of the maximum amplitude of dissonance produced during the discrepancy feedback period on determining the implicit attitude change that could be observed by comparing the two IATs that subjects completed during the experiment.

I used a correlation to determine the relationship between the difference in the IATs and the self-assessment of dissonance scale. Again, I examined the entire averaged score, the averaged score of the first five statements, which assessed the discomfort created after subjects saw the discrepancy rate, and the averaged score of the second five statements, which assessed subjects' current explicit attitudes about height and leadership, for all twenty subjects. The correlation between the difference in the IATs and the entire averaged score of the self-assessment of dissonance was 0.46, which was statistically significant ($p < .05$). This indicates a positive relationship between the difference in the IATs and the entire averaged score of the self-assessment of dissonance scale. The correlation between the difference in the IATs and the averaged score for the first five statements of the self-assessment of dissonance was .53, which was statistically significant ($p < .02$). This indicates a positive relationship between the difference in the IATs and the averaged score for the five statements that assess the discomfort created. The correlation between the difference in the IATs and the averaged score for the second five statements of the self-assessment of dissonance was -.06, which was not statistically significant. This further indicates that the five statements that assess the discomfort created were a more robust measurement of dissonance than the five statements that assess subjects' current explicit attitude, when examining the self-assessment measurement of cognitive dissonance.

Table 2

Correlation Between The Difference in the Implicit Association Tests and the Self-Assessment of Dissonance Scale

Section of Self-Assessment of Dissonance Measurement	Correlation (r)
Averaged Score for the First Five Statements	0.53
Averaged Score for the Second Five Statements	-0.06
Averaged Score for the Entire Measurement	0.46

Effect of the “Educational Intervention” on the Differences in the Implicit Association Tests. I used a one-way ANOVA to determine the effect of the “educational intervention” on the differences in the Implicit Association Tests. I used all twenty subjects when evaluating this relationship. There was not a significant effect of the “educational intervention” on the differences in IATs, $F(1, 18) = 0.07$. This indicates that there was no effect of the “educational intervention” on determining the implicit attitude change that could be observed by comparing the two IATs that subjects completed during the experiment.

Implication of Results:

As some of these statistical measurements indicate significant relationships, we can infer that parts of this experiment may indicate a significant relationship between cognitive dissonance and the eventual diminishment of prejudices about height and leadership. In Chapter Five, I will examine the validity of the measurements I used as a method for creating and testing cognitive dissonance. I will further discuss the significance and meaning of these results. I will examine what these significant relationships can imply for our understanding of cognitive dissonance and its role in diminishing and intensifying prejudices. I will also look at what these results imply for future research on the relationship between cognitive dissonance and prejudice.

CHAPTER FIVE: DISCUSSION AND CONCLUSION

Review of the Experiment; Discussion of Methods: Reflection on Demographics Survey, Reflection on the Marlowe-Crowne Social Desirability Scale, Reflection on the Self-Justification Writing Exercise; Discussion of Results: Results from the SCR Equipment, Results from the Self-Assessment of Cognitive Dissonance Scale, Relationship between Discrepancy Rate and Cognitive Dissonance, Relationship between Cognitive Dissonance and Implicit Attitudes, Implications of the Attitude Domain, Effect of the “Educational Intervention” on Implicit Attitudes; Future Research; Conclusion

Review of the Experiment:

My initial goal in conducting this experiment was to explore the role that cognitive dissonance plays in intensifying or diminishing prejudices, using the attitude domain of height and leadership. The attitude domain of height and leadership is actually incidental to this goal because through my experiment I attempt to create a model that will lead to the exposure and diminishment of implicit prejudices. My second goal was to determine if cognitive dissonance would be created when subjects learned about a discrepancy between their explicit and implicit attitudes in a particular attitude domain. My theory behind this plan, stemmed from the understanding that people can hold prejudices even with the knowledge that those prejudices may conflict with their other attitudes or behaviors. For example, someone could have a prejudice against a particular group of people, while working along side and respecting a member of that group. If it is possible for people to have these conflicting thoughts and actions, then they must be experiencing cognitive dissonance in these particular moments. This leads to my question about the relationship between cognitive dissonance and prejudice. My final goal was to measure the magnitude of dissonance created by using a physiological measurement, which would allow me to determine subjects’ physiological responses to the creation of dissonance, rather than relying solely on rating scale measurements that assess subjects’

inferential interpretation of the discomfort produced by cognitive dissonance. The physiological measurement will give me a more robust understanding of how the autonomic nervous system reacts when dissonance is created and the magnitude of dissonance that needs to be produced to induce attitude change. Through a physiological measurement, we can empirically study the evidence for the creation of dissonance and determine the magnitude of dissonance that will lead to the intensification and diminishment of prejudices.

As I explained in my previous chapters, I took a different approach to create dissonance than those that have been commonly used in the past. This method directly compares subjects' explicit and implicit attitudes about the relationship of height and leadership. As cognitive dissonance is created when a person holds two conflicting cognitions or attitudes, I believed that a subject who was able to see a visual representation of this conflict by viewing a score that showed the rate of discrepancy between their explicit and implicit attitudes about a specific attitude domain, would experience a greater magnitude of dissonance than a subject who was asked to complete the usual counter-attitudinal essay, for example. Once dissonance has been created, it is necessary to understand how much has been created so we can assess the effect that different levels of dissonance can have on the intensification or diminishment of an attitude or prejudice. I used both a physiological measurement and a self-assessment rating scale when measuring cognitive dissonance to ensure that I could observe and evaluate the dissonance created even if one of these measurements was ineffective. Most importantly, for this experiment, I wanted to know how prejudices might change after cognitive dissonance was created, making it necessary to measure the subjects' implicit attitudes before and after the dissonance was created to observe changes in subjects' implicit attitudes. By measuring the

dissonance created and providing an educational intervention, we can understand how prejudices can be diminished or intensified when subjects experience cognitive dissonance. Once we understand this relationship, it is possible to use the connection between cognitive dissonance and prejudices to help reduce a variety of prejudices.

Discussion of Methods:

Before discussing the results of the experiment, I will reflect on a few aspects of my methods. This allows me to expand on why I used specific methods, as well as how I might want to change them in the future. Following this discussion, we look more closely at the results presented in Chapter Four and reflect on the implications that can be interpreted by significant results that were found.

Reflection on the Demographics Survey. In Session One, I had my subjects complete a demographics survey that gathered information about their age, sex, race, country born in, country of permanent residence, height, and involvement as a student leader on campus. Although I had intended to measure the correlations between these demographics and their relationship to the subjects' initial explicit and implicit attitudes, the demographics for subjects' age, sex, race, country born in, country of permanent residence, and involvement as a student leader on campus, were too homogenous to examine these relationships. I used a correlation to measure the relationship between subjects' height and their initial explicit and implicit attitudes, but I did not find a relationship. The demographics survey has the potential to explore the relationships between these demographic factors and the subjects' explicit and implicit attitudes, but we would need a more diverse subject pool to do so.

Reflection on the Marlowe-Crowne Social Desirability Scale. In Session One, I used the Marlowe-Crowne Social Desirability Scale (MC-SDS) as a predictor variable to determine which subjects would be likely to have explicit attitudes that were inconsistent with their implicit attitudes. My rationale for using the MC-SDS, was that someone with a high level of social desirability would likely have an explicit attitude that would reflect their expectation of socially acceptable attitudes, while their implicit attitude would reflect their automatic evaluations or internal evaluations based on a belief that a subject is unaware they hold about the attitude domain, resulting in a significant and noticeable difference between their explicit and implicit attitudes. The initial purpose of the MC-SDS was to predict the relationship between the explicit and implicit attitudes and to specifically choose subjects with a high score on the MC-SDS with extreme explicit attitudes, explicit attitudes that both correlated and did not correlate height and leadership. I was hoping to find subjects on the extreme ends of the spectrum to evaluate the role that dissonance plays in intensifying and diminishing implicit prejudices. I expected that subjects with an extreme explicit attitude that height and leadership are not correlated would have an implicit attitude that they are correlated and that someone with an extreme explicit attitude that height and leadership are correlated would have an implicit attitude that they are not correlated because their explicit attitudes would reflect their belief of what is socially acceptable, which could be either that height and leadership are or are not correlated. These expectations are based on the understanding that social desirability is the source of these inconsistencies, meaning subjects will only have inconsistent explicit and implicit attitudes if they also have high social desirability.

By using the MC-SDS as a predictor variable to determine the discrepancy between explicit and implicit attitudes, I can enhance the selectivity of my subjects to ensure that the subjects with extreme explicit attitudes will have inconsistent implicit attitudes. This will allow me to determine how the cognitive dissonance created by viewing the discrepancy score will influence the attitude change for one extreme explicit attitude versus the other. Thus exploring whether a subject whose extreme explicit attitude is that height and leadership are not correlated, while their implicit attitude is that height and leadership are correlated, will be likely to intensify or diminish their implicit attitude. The same question can be asked for a subject whose extreme explicit attitude is that height and leadership are correlated, while their implicit attitude is that height and leadership are not correlated. There are two possible outcomes that I am able to observe. First, subjects with one explicit attitude will intensify their implicit attitudes, while the subjects with the other explicit attitude will diminish their implicit attitudes, resulting with all subjects holding the same implicit attitude. For example, the subjects with the explicit attitude that height and leadership are not correlated could diminish their implicit attitude that height and leadership are correlated and the subjects with the explicit attitude that height and leadership are correlated could intensify their implicit attitude that height and leadership are not correlated, so that all subjects now hold the implicit attitude that height and leadership are not correlated. Second, all subjects' implicit attitudes will either be intensified or diminished due to the dissonance created. For example, the subjects with the explicit attitude that height and leadership are not correlated would intensify their implicit attitude that height and leadership are correlated and the subjects with the explicit attitude that height and leadership are correlated would also intensify their implicit attitude that height and leadership are not correlated. As explained above,

both implicit attitudes could also be diminished. This would imply that when cognitive dissonance is created, implicit attitudes are only intensified or diminished, regardless of the explicit attitude. Although the attitude change is also dependent on the magnitude of dissonance created, the MC-SDS would allow me to know and focus on the subjects who would be most likely to have a discrepancy between their explicit and implicit attitudes, which means it is more likely that dissonance will be created and they will experience the attitude changes described above.

The results I gathered in Session One, however, showed that subjects mostly had explicit attitudes that height and leadership are not correlated, while a few subjects fell in the middle range for the attitude domain. This meant that I was unable to fully evaluate the difference between the two extreme attitudes and the role that cognitive dissonance might play in intensifying one implicit prejudice, while diminishing the other. Though this was not the case, using the MC-SDS, did save me time and helped me choose which subjects would be most likely to have inconsistent explicit and implicit attitudes. However, as my subjects had social desirability scores that were more in the middle range (11-22), rather than the higher range (23-33), this may have played a role in why only half of my subjects had explicit attitudes that greatly differed from their implicit attitudes. In the future, it may be helpful to have a pilot test where subjects' explicit attitudes, social desirability, and implicit attitudes are all tested at the same time to determine whether the MC-SDS plays a significant role in determining the likelihood of an inconsistency between explicit and implicit attitudes. When testing all three measurements together we can ensure that the MC-SDS enhances selectivity by acting as a predictor variable as had been expected, by determining that all subjects with high scores on the

MC-SDS have a discrepancy between their explicit and implicit attitudes, while subjects with low scores on the MC-SDS do not have a discrepancy between their explicit and implicit attitudes. Although this measurement was necessary for the procedure of my experiment, it is important to step back and understand its relationship to explicit and implicit attitudes to ensure it is the best predictor variable or if a different predictor variable would be more effective.

Reflection on the Self-Justification Writing Exercise. In Session Three, after subjects had viewed their discrepancy score, I recorded the level of dissonance created using the skin conductance response equipment, subjects completed the self-assessment of dissonance scale, and subjects were asked to complete a writing exercise where they justified why their explicit attitudes were inconsistent or consistent with their implicit attitudes, as reflected in their discrepancy score. I used this to help reduce any dissonance that was created because the reduction of dissonance plays a role in the intensification or diminishment of the implicit attitude. Only after dissonance has been reduced, is it possible to see what the resulting attitude will be. When looking at the role that this justification writing exercise played in reducing the dissonance created, we do not have any clear evidence that this method affected subjects' implicit attitude change.

When looking at the physiological results recorded by the SCR equipment, one would expect to see a negative relationship between the maximum amplitude for the discrepancy feedback recording and the maximum amplitude for the dissonance reduction recording. (The dissonance reduction recording, as explained in Chapter Three, was taken after the self-justification writing exercise and the educational intervention were completed.) I used a correlation to determine the relationship between the maximum amplitude for the discrepancy feedback and the maximum amplitude for the dissonance reduction recordings (using only the

sixteen subjects with valid results), the correlation was 0.54, which was statistically significant ($p < .05$). Although the relationship was significant because the subjects had a high discrepancy feedback recording and a high dissonance reduction recording, this result is not significant for this experiment because it showed that the magnitude of dissonance recorded during the dissonance reduction recording was at a similar amplitude as the discrepancy feedback recording, rather than at a lower amplitude, which would mean the dissonance created during the discrepancy feedback period would have been reduced after the self-justification writing exercise and the educational intervention had been completed, as was expected. The results from the dissonance reduction recording were likely inconsistent with my expectations because of the ineffectiveness of the SCR equipment, rather than a reflection that the dissonance was not reduced. In future research we should continue to explore the role that this justification writing exercise could have in the reduction of dissonance, by comparing the reduction of dissonance for subjects who justify the discrepancy to subjects who do not. This will allow us to explore whether justifying the discrepancy was used to reduce the dissonance or if the dissonance was reduced on its own over the time of the experiment.

Discussion of Results:

In this section we turn to the results that were described in Chapter Four. In this section, we will discuss the meaning and implications of the results I found.

Results from the SCR Equipment. As we saw in Chapter Four, when looking at the data that was recorded by the SCR equipment, we did not find any significant results. This held true when comparing the maximum amplitude for the discrepancy feedback to the discrepancy rate between explicit and implicit attitudes, to the differences in the IATs, and to the self-assessment of

cognitive dissonance. All three relationships were insignificant, leading to the question of whether the SCR equipment is a good measurement for cognitive dissonance.

When we initially discussed the previous research discussing the relationship between cognitive dissonance and the SCR equipment in Chapter Two, we saw how Croyle & Cooper (1983) and Elkin & Leippe (1986) attributed the arousal recorded by the SCR equipment to the creation of cognitive dissonance. Although this relationship seemed plausible, I inferred that the arousal was not clearly a reflection of the dissonance created because there was no attitude change (in Croyle & Cooper) and no reduction in the arousal recorded (in Elkin & Leippe). As Festinger's (1957) theory of cognitive dissonance emphasizes that the creation of dissonance leads to the intensification or diminishment of the attitude and these attitude changes come about as a result of the reduction of dissonance, it is not likely that the electrodermal activity recorded during Croyle & Cooper's and Elkin & Leippe's experiments can be attributed to an assessment of the possible dissonance created. As I too was unable to find a clear relationship between the electrodermal activity recorded by the SCR equipment and the magnitude of dissonance created, it is possible that the SCR equipment is not the best instrument to measure cognitive dissonance. There are also a variety of other reasons for why I did not find significant results when using the SCR equipment. As I explained in Chapter Three, I removed four of my subjects because their results did not show anything but negligible results of electrodermal activity.⁸ As I was only able to examine the results from the remaining sixteen participants, this could have affected the overall results for the assessment of arousal created during the discrepancy feedback recording that would have indicated a physiological representation of the creation of cognitive dissonance.

⁸ As mentioned in Chapter Three, the negligible results of EDA were likely due to the old electrode strips that were used when recording these subjects' responses.

The importance of obtaining a physiological representation of cognitive dissonance, would have enabled us to gauge a more precise understanding of the magnitude of dissonance that needs to be created to affect attitude change. As discussed in Chapter Two, our autonomic nervous system can tell a different story than our mind. We may interpret a feeling or experience to represent one thing when our ANS response will show that it is another. People are not always attuned to the changes they are experiencing in their bodies, so when cognitive dissonance leads to a feeling of discomfort or negative arousal that will lead to an attitude change, people might not be aware of why or that they are even experiencing this discomfort, but a physiological measurement would still be able to detect the slightest experience of negative arousal produced by the stress response reacting to the inconsistencies between the thoughts, attitudes, or behaviors that produce cognitive dissonance. By using the physiological measurement, we could ensure that we are assessing the exact magnitude of cognitive dissonance that will lead to attitude change, without being concerned that a subject will misinterpret what they are feeling. With this empirical measurement for dissonance, we could have determined the exact magnitude of dissonance that would have lead to the intensification or diminishment of prejudices.

The magnitude of dissonance plays a significant role in whether an attitude will be diminished or will intensified. In the case of understanding prejudices, it would be important to understand when the magnitude of dissonance will help reduce the prejudice or when it may be too high and will result in an intensification of the prejudice instead. Although, Croyle & Cooper (1983) and Elkin & Leippe (1986) attributed the arousal assessed by the SCR equipment to the creation of dissonance, they were unable to definitively show the magnitude of dissonance created that will lead to attitude change. As my results were also unable to show the magnitude

of dissonance as represented by the physiological arousal created that is necessary to produce attitude change, it is possible that the SCR equipment is not the best measurement for assessing the magnitude of dissonance that is needed to produce attitude change. Although another physiological measure could give us more insight about the magnitude of dissonance created, we are still able to understand the relationship between cognitive dissonance and prejudices by using behavioral or scaling measurements, as we explore in the following section.

Results from the Self-Assessment of Cognitive Dissonance Scale. Before, we go forward with this discussion, however, I would like to reflect on the Likert scaling procedure that I used for the self-assessment of dissonance scale. As we discussed in Chapter Four, the self-assessment of dissonance scale only obtained significant results for the five statements that assessed the discomfort created after subjects viewed the discrepancy between their explicit and implicit attitudes, and not for the five statements that assessed the subjects' current explicit attitude about height and leadership. This indicates that when participants were rating how strongly they agreed or disagreed with the statements, the statements which examined how the discomfort created were a better assessment of dissonance than the statements about subjects' current explicit attitudes. It is logical that the five statements about the discomfort created appear to be a better indication of dissonance because these statements assess feelings of discomfort and when someone is experiencing discomfort related to the understanding that they hold discrepant attitudes, it is well assumed that cognitive dissonance has been created. Although the relationship between both sections of the self-assessment of dissonance scale theoretically work together, we can determine, that the self-assessment of dissonance scale would be stronger if we only use and possibly expand the section that assesses the discomfort created by viewing the

discrepancy score. By changing the scale for future research, we can be sure that we are directly measuring the dissonance created when subjects view the discrepancy score. This leads us to our following discussion about the relationship between discrepancy rate and cognitive dissonance, particularly while using the self-assessment of dissonance scale.

Relationship between Discrepancy Rate and Cognitive Dissonance. In Chapter Four, we found a significant relationship between the discrepancy score and the self-assessment of dissonance scale. (For the remainder of this discussion, when I refer to the self-assessment of dissonance scale, I am referring to the five statements on the scale that assessed the discomfort created by viewing the discrepancy score.) The discrepancy score shows subjects whether they have a high or a low discrepancy between their explicit and implicit attitudes. As we have discussed previously, when someone realizes, either consciously or not that they hold inconsistent thoughts or attitudes about a particular attitude domain, this understanding leads to the creation of cognitive dissonance. We can interpret two important understandings from the relationship between the discrepancy score and the self-assessment scale. First, we can assess the creation of dissonance by using this self-assessment scale because, as explained in the previous section, this scale appears to be a good measure of discomfort regarding the dissonance we want to assess. Second, we can determine that cognitive dissonance is created when subjects view the results of the discrepancy between their explicit and implicit attitudes through the discrepancy score, an original tool that was created for this experiment. The validity of this discrepancy score gives us the opportunity to turn away from other methods of creating dissonance that do not directly create dissonance in the same way as does the discrepancy score.

Previously we have discussed the method of counter-attitudinal essays and why they may not as directly assess cognitive dissonance, though they are often used to do so. Although subjects may develop inconsistent attitudes after completing the counter-attitudinal essay, leading to the creation of dissonance, the inconsistency is between two attitudes that subjects are aware they hold, or two explicit attitudes about the attitude domain. In contrast, the discrepancy score shows subjects the preexistence and internalization of the discrepancy between explicit and implicit attitudes about the attitude domain. By recognizing this discrepancy, one that subjects did not actively create by writing a counter-attitudinal essay and one that subjects were unaware they held, it is possible for subjects to decrease their implicit prejudices, and not only change their explicit attitudes, as may happen after completing counter-attitudinal essays. In future research, it would be helpful to directly compare the discrepancy score to counter-attitudinal essays to determine the exact strengths and weaknesses of the two models. We could compare these models by having subjects complete either the discrepancy score or the counter-attitudinal essay procedure regarding the same attitude domain. Upon completion, we could examine which method led to the creation of greater magnitudes of dissonance and long term attitude change. Based on the difference in magnitudes of dissonance created and of how significantly attitudes changed, we would be able to determine which method should be used to create cognitive dissonance.

Even so, based on my results we can see that by encouraging subjects to reflect on their inconsistent attitudes, it may be possible to create longer term attitude change. We see from the relationship between the discrepancy score and the self-assessment of dissonance scale, that at some level it is necessary for subjects to understand the relationship between their own explicit

and implicit attitudes before it is possible for them to change any inconsistencies that appear. When subjects have a high discrepancy, they are more likely to report a greater sense of discomfort or dissonance. As we will be able to see in the following section, the creation of dissonance after viewing this discrepancy, does lead to a change in attitude. Before we move on to that section, however, I want to emphasize that dissonance can be created naturally and we might not even be aware that we are experiencing a sense of discomfort that will motivate us to diminish or intensify our thoughts or attitudes. However, by using the discrepancy score we can ensure that subjects are made aware of this discrepancy because the score shows a discrepancy based on a quantitative understanding of the subjects' attitudes. When presented with these results, it can be more difficult to ignore the established discrepancy, encouraging a change in attitude. This finding could greatly impact how we choose to research cognitive dissonance in the future.

Relationship between Cognitive Dissonance and Implicit Attitudes. As we discussed above, the first step in understanding the relationship between cognitive dissonance and prejudices, is to create dissonance. In this experiment, I attempt to create dissonance by using the discrepancy score which showed subjects a visual representation of the discrepancy rate between their explicit and implicit attitudes about the association between height and leadership. After subjects viewed this score and dissonance was created, causing a sense of discomfort, which was recorded using the SCR equipment and the self-assessment of dissonance scale, subjects were motivated to reduce the discomfort and change their attitudes, specifically their implicit attitudes. As we discussed in Chapter Three, implicit attitudes are a representation of implicit prejudices or automatic evaluations that result in discriminatory thoughts, attitudes, or behaviors. These

implicit prejudices have often been engrained by the behaviors and attitudes of our society or the society in which we grew up, but are prejudices that people are unaware that they hold. When looking at the relationship between the dissonance that has been created and implicit attitudes, we can understand the role that cognitive dissonance plays in changing implicit attitudes, specifically relating to the attitude domain of height and leadership.

As we learned in Chapter Four, the amount of dissonance created, as evaluated on the self-assessment of dissonance scale, was positively correlated with the differences in scores on the IATs. This indicates that when subjects reported a greater sense of discomfort or dissonance on the self-assessment scale, there was also a greater difference between subjects initial IAT scores acquired during Session Two and their final IAT scores acquired during Session Three. A large difference score between IATs indicated that subjects' implicit attitudes or implicit prejudices about the attitude domain of height and leadership were diminished. This means that the greater the amount of cognitive dissonance produced, the greater the diminishment in the implicit prejudice that height and leadership are correlated. Though I was not able to assess the magnitude of dissonance created that leads to this change in attitude through a physiological measurement, these results indicate that the self-assessment scale is able to evaluate that dissonance has been created and has shown that the creation of dissonance can lead to the diminishment of prejudices. As discussed previously, physiological measurements provide us with an accurate measurement of the negative arousal or discomfort produced by the creation of cognitive dissonance, enabling us to better control for and predict the exact amount of dissonance that needs to be created to induce attitude change. Although a behavioral measurement, or specifically, a rating scale measurement can be influenced by subjective

interpretations of the physical discomfort created by dissonance, leading to an inconclusive understanding of the exact magnitude of dissonance that has been created, the rating scale measurement still has enough validity to demonstrate that dissonance has been created and can be connected to the result in attitude change.

With this correlation, we can begin to gain a more distinct understanding for how cognitive dissonance can affect the diminishment of prejudices. Interestingly, there was no indication that the dissonance caused any significant intensifications of prejudices, which was one reaction that I was curious to observe. Although we were unable to determine the exact magnitude that allowed for the implicit prejudices to be reduced, we can still see that there was a clear relationship between the creation of dissonance and the diminishment of implicit prejudices. We can interpret from these results, that when people are made aware that their explicit attitude is inconsistent with their implicit attitude and consequently dissonance has been created, people are motivated to change their implicit attitude to become more consistent with their explicit attitude, thus reducing the dissonance that had been created, and as shown by this experiment, diminish their implicit prejudices. From these results we can begin to understand the implications of this relationship to other research about cognitive dissonance and prejudice, as well as potential methods to help reduce other prejudices.

Implications of the Attitude Domain. The attitude domain that was used for this experiment was the attitude toward the relationship between height and leadership, an attitude domain, that in many regards, is less likely to stir emotions due to a historical, cultural or personal context, particularly in the United States, than the attitude domain of race and violence, for example. When someone is speaking about race and violence, people are hyperaware of the connotations

behind this attitude, why it is a problem, and the fact that this attitude should be changed, this is not as often the case when people discuss height and leadership. People are not as likely to be concerned or upset when a short leader is undermined or insulted because of their height, but they do get upset, and rightly so, when someone is wrongfully accused of being violent because of their race. This experiment allows us to determine that prejudices related to height and leadership exist, which means that these prejudices could prevent shorter people from obtaining leadership positions. We can also use the results from this experiment to show that if a discrepancy in attitudes for the attitude domain of the association between height and leadership can lead to the creation of at least some magnitude of dissonance that will cause a change in attitude, we might see an even more significant change in attitude when looking at attitude domains that have been assigned greater importance within our society, such as race and violence. There are a variety of implications that can be interpreted from the results of this experiment, but before we move forward with that discussion, it is necessary to discuss one more aspect of the results, that could help us understand what educational methods should and should not be used to help diminish implicit prejudices.

Effect of the “Educational Intervention” on Implicit Attitudes. As we saw in Chapter Four, the educational intervention in this experiment did not have any significant relationship to the difference in IATs. This is likely due to the type of educational intervention that was used.

Although learning about people who belong to a discriminated group, in this situation, respected world leaders whose heights are below average, has the potential to act as a strong educational intervention, it is possible that an educational intervention that allows subjects to interact within the attitude domain more directly, for example, by seeing pictures of people in the target group

being discriminated against and discussing why this was unjust, could have a greater impact on the subjects and would lead to a clear relationship between an educational intervention and a diminishment of implicit prejudices. We have seen from previous research, as was discussed in Chapter Two, that educational interventions are successfully used to diminish prejudices and discriminatory behavior. These educational interventions may take place over a set period of time and often involve more hands on tasks, such as the educational intervention conducted by Connolly and Hosken (2006) where subjects became more aware and respectful of diversity through theatrical plays, workshops, and teacher-led classroom activities. This model allows for a more thorough educational intervention, in comparison to the educational intervention used in my experiment, which only touched the surface of the prejudice and did not fully teach subjects why they should not discriminate against short leaders. In the future, when using an educational intervention for this experimental model, we may want to have subjects complete a task that more explicitly defines the problem with the prejudice that height is correlated to leadership ability, if using the same attitude domain, or another prejudice that is being studied. Educational interventions are valuable tools used to diminish prejudices and should be utilized in the future. As the educational intervention for this experiment did not significantly impact subjects' change in attitude, we are able to affirm that the dissonance created appears to be the main variable that caused subjects' implicit prejudices about height and leadership to diminish.

Future Research:

As we have seen through this discussion, cognitive dissonance plays a role in diminishing prejudices. By enabling people to understand that they hold an implicit prejudice that conflicts with their explicit attitude, we can encourage the creation of cognitive dissonance and help

others begin the process to change their implicit prejudices to become more consistent with the less prejudiced explicit attitude that they want to have. We know that as implicit prejudices are automatic evaluations, they are not necessarily in line with the expectations and values that we might hold. This is why when cognitive dissonance is created, we are motivated to reduce the dissonance and change our implicit attitudes to be consistent with our explicit attitudes. This understanding can be applied to any attitude domain in which people hold prejudices.

Looking forward, we should continue researching the relationship between cognitive dissonance and prejudices. When working with the experimental model as described in Chapter Three, we want to make the adjustments suggested above and ensure that the model is effective. Ideally we would be able to conduct an experiment using a larger number of subjects to have a greater range of people who might fall on the extreme ends of the attitude domain spectrum, as we had originally hoped for in this experiment. With this greater range of attitudes, we could gain a better understanding of how the interaction of dissonance and these two extreme explicit attitudes affect the diminishment or intensification of prejudices.

Throughout our discussion, we emphasized the importance of capturing the magnitude of dissonance that causes subjects to change their attitude. Although in my experiment, we were able to see evidence that the creation of dissonance led to attitude change, the exact magnitude of dissonance that caused this attitude change could not be determined. As mentioned earlier, it will be important to use another psychophysiological measurement to determine the exact magnitude of dissonance to fully understand how much dissonance must be created to diminish and intensify prejudices. When we can determine how much dissonance should be created to diminish prejudices, we can place people with prejudices in situations that will create this

dissonance. With this understanding of the magnitude of dissonance that intensifies prejudices, we can also determine what situations might cause prejudices to intensify and when we need to intervene to diminish these prejudices.

Through this experiment, we were able to observe implicit prejudices. The next step, once we understand the magnitude of dissonance that is needed to diminish prejudices, is to work with subjects who have consistent explicit and implicit prejudices and place them into situations where the necessary magnitude of dissonance will be created so both their explicit and implicit prejudices will be diminished. The relationship between cognitive dissonance and prejudices, could enable us to diminish all prejudices. As prejudices often arise through engrained societal influences that are based on situations that are not reflective of the entire discriminated group, enabling people to recognize that their prejudices do not coincide with the realities of the individuals in a target group, will lead to the creation of cognitive dissonance and the diminishment of the prejudices. It is important for us to create this understanding among people so we can build inclusive and respectful communities.

Conclusion:

From this experiment we can conclude that there is a relationship between cognitive dissonance and prejudices: cognitive dissonance leads to the diminishment of implicit prejudices. We can ensure the long-term effects of a diminishment in prejudices by creating cognitive dissonance because when people are motivated to reduce this dissonance they do so by changing and solidifying their attitude. In the case of my experiment, subjects diminished their implicit prejudice and solidified their new attitude that height and leadership are not correlated. When this change takes place, people want to prove that they made the correct decision, which is why

they are unlikely to change their mind, making the attitude change a long-term effect. This experiment model is able to set the track for a better understanding of how prejudices are formed. We can use this model to help predict situations where prejudices will be intensified and where they will be diminished, enabling us to address any prejudices that have been created and work to diminish them.

Festinger's (1957) research about cognitive dissonance has enabled us to create an experimental model that will promote change. We have been able to observe the relationship between subjects viewing the discrepancy rate between their explicit and implicit attitudes about height and leadership, and the creation of cognitive dissonance, which led to the diminishment of implicit prejudices about the correlation between height and leadership. Our understanding of this relationship, allows us to demonstrate the importance of using cognitive dissonance when trying to diminish prejudices. To parallel the influence of recognizing that one holds two conflicting attitudes, we can use the example of when people meet members of a target group who do not meet their prejudiced expectations. This conflict of expectations and reality creates dissonance, and based on my experiment, we can predict that when someone is encouraged to face a discrepancy between their attitude and reality, prejudices are more likely to be diminished. This relationship can be transformed into educational interventions or other methods that might be used to help diminish prejudices. By recognizing the reality, people are able to realize that what they had learned or expected is not true. Once people are made aware of this discrepancy, cognitive dissonance will be created and they can diminish their prejudices, regardless of the attitude domain.

APPENDIX A
Recruitment Flyer

WANT TO MAKE \$15 DURING CITIZEN SCIENCE?

PARTICIPATE IN MY SENIOR PROJECT!

LEARN ABOUT ATTITUDES TOWARD HEIGHT AND
LEADERSHIP!!

Participate in this awesome 3 part study!

You must be 18 or older to participate.

**If you would like to participate, please sign
up for the first session at [http://tinyurl.com/
HarrisSeniorProject](http://tinyurl.com/HarrisSeniorProject)**

If you have any questions, please email Emily Harris
(eh7946@bard.edu).

APPENDIX B Consent Form

Thank you for participating in this study for my Senior Project!

Background: My research is studying the attitude toward height and leadership. I will be studying multiple aspects of attitude throughout this study with the aim of gaining some insight into how attitudes develop.

You must be 18 years of age or older to participate.

What you will do in this study: This study is split into 3 sessions. The first session will ask you to complete 3 surveys looking at explicit attitudes and will last for about 30 minutes. Half of the participants who complete session 1 will be asked to continue to Sessions 2 and 3, while the other half will have completed their involvement in the study. You will be notified about your continued involvement soon after the completion of Session 1 and will be asked to set up a second time to meet. Session 2 will ask you to complete an Implicit Association Test. This session will be examining implicit attitudes and will last for about 10 minutes. Session 3 will have you complete small tasks, another attitude survey, a writing sample, and the Implicit Association Test again, all while being connected to skin conductance response equipment. This equipment is only testing for electrical activity of your skin and will be taking harmless and painless recordings from the surface of your skin. No shocks will be administered. Session 3 will last for about 60 minutes.

Risks and Benefits: There are a few risks and benefits that will be associated with participation in this study, as is true of any study. You may experience some emotional discomfort throughout this process, though I have added specific measures that should help reduce this discomfort. Through participation in this study, however, you will have the opportunity to learn about yourself and gain a greater sense of self-awareness that may help you to reevaluate your current behavior or attitude to make positive changes. You will also have the satisfaction in knowing that you did a service in participating in a Psychological study and helping me with my Senior Project.

Compensation: In exchange for your participation you will receive a total of \$15. You will receive \$3 after Session One, an additional \$5 after Session Two, and an additional \$7 after Session Three.

Your participation is confidential: All information you provide will be kept confidential and will be stored in a password protected account on my computer. Any forms collected will be stored in a sealed envelope to which only my advisor and I will have access. Neither your name nor any identifying information you provide will be used during the write up of my research. The information you provide during this study will only be kept until April 30, 2014.

Your participation is voluntary: If for any reason during this study you do not feel comfortable, you may leave the laboratory and still receive compensation for participating and your information will be discarded. When this study is complete, you will be provided with the results of the experiment if you request them, and you will be free to ask any questions.

My research will be publicly available in the Bard Stevenson Library and online through the Digital Commons after April 30, 2014.

Contact information: If you have any questions or would like to contact me, please email me at eh7946@bard.edu. My advisor, Stuart Levine, can be contacted through email at levine@bard.edu. You may also contact the chair of the Institutional Review Board by emailing irb@bard.edu.

Statement of Consent: I have read the above information and understand my rights as a participant. I consent to participate in this study.

Signature of Participant _____

Print Name _____

Date _____

APPENDIX C

Debrief Statement

Thank you for completing this study! The purpose of this study was to research the larger question of “what role does cognitive dissonance play in diminishing or intensifying prejudice?” Cognitive dissonance is the theory developed by Leon Festinger that, “*The presence of dissonance* [or internal discomfort, which is developed when a person is faced with two conflicting thoughts] *gives rise to pressures to reduce or eliminate the dissonance. The strength of the pressures to reduce the dissonance is a function of the magnitude of dissonance*” (Festinger, 1957). The reduction of dissonance can lead to change in behaviors and beliefs. I am interested in understanding how these behaviors and beliefs either intensify or diminish prejudices. I am studying the prejudice toward height and leadership based on the research by Blaker et al., which found that people are perceived to have greater leadership potential if they are tall rather than short (2013). I am hoping to use this research to generalize my finding to the creation and reduction of other forms of prejudice.

The surveys taken during Session 1 were used to test for explicit (conscious) attitudes and the Implicit Association Test in Session 2 was used to test for implicit (unconscious) attitudes. In Session 3 I asked you to read the list of words to assess a baseline level of physiological arousal to compare to later measures of arousal. I showed you the comparison of your results on these tests to create cognitive dissonance. (The discrepancy between explicit and implicit attitudes is natural. Now that you have identified this discrepancy, it is possible to adjust your attitude and learn that height is not a reflection of leadership ability.) I used the skin conductance equipment to assess the physiological arousal that is experienced when cognitive dissonance is created, as self-report measures alone do not fully demonstrate cognitive dissonance. The use of this equipment is based on the studies performed by Robert T. Croyle and Joel Cooper in 1983 and by Roger A. Elkin and Michael R. Leippe in 1986. I aimed to reduce the dissonance created through the writing portion of the experiment where you tried to justify why there was a discrepancy between your explicit and implicit attitudes. For half of the participants there was also an educational intervention, where subjects learned about historical leaders who made a great impact in the world and whose heights were all below average. The second Implicit Association Test that was taken during Session 3 will be used to assess how your implicit attitudes have changed after experiencing cognitive dissonance.

I have four goals for this experiment:

- 1) Understand the link between cognitive dissonance and a physiological measurement.
- 2) Understand how subjects will respond when cognitive dissonance is created through the comparison of conflicting explicit (conscious) and implicit (unconscious) attitudes.
- 3) Understand how educational material will affect the reduction of dissonance, as well as how it affects resulting behavior or beliefs after the dissonance is reduced.
- 4) Examine the extent of prejudice against short people and their leadership abilities.

My research will be publicly available in the Bard Stevenson Library and online through the Digital Commons after April 30, 2014.

Contact information: If you have any questions or would like to contact me, please email me at eh7946@bard.edu. My advisor, Stuart Levine, can be contacted through email at levine@bard.edu. You may also contact the chair of the Institutional Review Board by emailing irb@bard.edu.

APPENDIX D
Demographics Survey

Please answer the following questions to the best of your ability.

1. What is your age? _____
2. What is your sex? _____
3. What is your race?
 - a. Hispanic/Latino
 - b. Black/African American
 - c. Asian/ Pacific Islander
 - d. White/non-Hispanic
 - e. Other
4. What country were you born in? _____
5. What country do you live in? _____
6. What is your height (in feet and inches)? _____
7. Are you a student leader on campus? (A student leader is defined as someone who takes an active role in a student organization or is viewed as a role model on campus or in their community, such as a club head, a member of student government, a peer counselor, a TLS leader, a team captain, etc.)
 - a. Yes
 - b. No

APPENDIX E
Marlowe-Crowne Social Desirability Scale

Listed below are a number of statements concerning personal attitudes and traits. Read each item and decide whether the statement is *true* or *false* as it pertains to you personally.

1. Before voting I thoroughly investigate the qualifications of all candidates.

True False

2. I never hesitate to go out of my way to help someone in trouble.

True False

3. It is sometimes hard for me to go on with my work if I am not encouraged.

True False

4. I have never intensely disliked anyone.

True False

5. On occasions I have had doubts about my ability to succeed in life.

True False

6. I sometimes feel resentful when I don't get my way.

True False

7. I am always careful about my manner of dress.

True False

8. My table manners at home are as good as when I eat out in a restaurant.

True False

9. If I could get into a movie without paying and be sure I was not seen I would probably do it.

True False

10. On a few occasions, I have given up doing something because I thought too little of my ability.

True False

11. I like to gossip at times.

True False

12. There have been times when I felt like rebelling against people in authority even though I knew they were right.

True False

13. No matter who I'm talking to, I'm always a good listener.

True False

14. I can remember "playing sick" to get out of something.

True False

15. There have been occasions when I took advantage of someone.

True False

16. I'm always willing to admit when I make a mistake.

True False

17. I always try to practice what I preach.

True False

18. I don't find it particularly difficult to get along with loud mouthed, obnoxious people.

True False

19. I sometimes try to get even rather than forgive and forget.

True False

20. When I don't know something I don't at all mind admitting it.

True False

21. I am always courteous, even to people who are disagreeable.

True False

22. At times I have really insisted on having things my own way.

True False

23. There have been occasions when I felt like smashing things.

True False

24. I would never think of letting someone else be punished for my wrongdoings.

True False

25. I never resent being asked to return a favor.

True False

26. I have never been irked when people expressed ideas very different from my own.

True False

27. I never make a long trip without checking the safety of my car.

True False

28. There have been times when I was quite jealous of the good fortune of others.

True False

29. I have almost never felt the urge to tell someone off.

True False

30. I am sometimes irritated by people who ask favors of me.

True False

31. I have never felt that I was punished without cause.

True False

32. I sometimes think when people have a misfortune they only got what they deserved.

True False

33. I have never deliberately said something that hurt someone's feelings.

True False

APPENDIX F
Baseline Level of Arousal Task

Please read the following words. Read aloud at your own pace and pronounce each word to the best of your ability. This is not a timed task or a memory task, you do not need to speed through them or remember them.

1. Bih
2. Mef
3. Naj
4. Coj
5. Hif
6. Geb
7. Zib
8. Pyh
9. Jek
10. Qih
11. Wez
12. Deh
13. Kug
14. Riw
15. Tup
16. Xat
17. Ved
18. Sij
19. Loh
20. Fov

APPENDIX H

Educational Intervention

In a 2013 study, Blaker et.al found that, “height positively influences leadership perception for both men and women, though the effect is stronger for men.” They found that many believe that a taller person is perceived to have better leadership ability than a shorter person. By looking at historical figures, however, we can see that height does not define a person’s leadership ability. In fact, many very influential leaders have been short. Although the following leaders were not all born in the United States or were born during a period where the average heights were a little shorter, I will provide you with the average heights of men and women in the United States as a reference point when thinking about the height of these leaders. The average height for men in the United States is 5’9” and the average height for women in the United States is 5’4”.

1. David Ben-Gurion was Israel’s first Prime Minister. He helped create a strong Israeli defense against neighboring Arab states. He initiated peace talks with other leaders in the Middle East. Ben-Gurion was a monumental leader in Israel’s establishment and development. His height was 4’11”.
2. Immanuel Kant was an 18th Century philosopher. His ideas about reasoning and ethics strongly influenced modern philosophy. His height was 5’0”.
3. Mother Teresa was a nun, renowned for her charity and devotion to helping the sick, poor, and anyone in need. She received the Nobel Peace Prize in 1979. Her height was 5’0”.
4. Harriet Tubman was one of the most famous “conductors” on the underground railroad, helping hundreds of slaves obtain freedom in the Northern states. She risked her own life to save numerous others. Her height was 5’0”.
5. Mohandas (Mahatma) Gandhi was a leader of the movement for India’s independence. He is well known for his peaceful hunger strikes and choice to fight peacefully through boycotting rather than with physical weapons. His height was 5’4”.
6. Ludwig Van Beethoven one of the most famous composers of classical music. His music has largely influenced the development of music since the 18th Century. His height was 5’4”.
7. Joseph Stalin was the leader of the Soviet Union from the mid-1920s until 1953. Though he is infamous for his role in killing millions of Soviet Union citizens, he was able to gain distinct respect from those he ruled. His role in the industrialization of Russia is still revered today. His height was 5’4”.
8. John Hancock was a major figure in the American Revolution. He lead many protests against British taxation. He was the first representative to sign the Declaration of Independence. He was the first governor of Massachusetts. His height was 5’4”.

9. Dmitry Medvedev is the current Prime Minister of Russia since 2012. Before he was Prime Minister he was the President of Russia between 2008 to 2012. During his term as president he instituted a program that aimed at modernizing Russia's economy and society. His height is 5'4".
10. James Madison was the fourth president of the United States of America from 1809-1817. He composed the first drafts of the U.S. Constitution and the Bill of Rights. He helped Thomas Jefferson found the Democratic-Republican party in 1792. He led the United States into the War of 1812 against Great Britain. His height was 5'4".
11. Nicolas Sarkozy was the President of France between 2007 to 2012. Sarkozy has been an influential leader who has helped give France more power on the world stage. His height is 5'5".
12. Napoleon Bonaparte was a French military leader who conquered much of European territory during the early 19th Century. His height was 5'6".
13. Martin Luther King Jr was a Civil Rights activist during the 1960s. He lead many peaceful protests fighting for the equal rights of Black people in America. He is a symbol of peace in the United States. And is famous for leading the March on Washington in 1963 where he delivered his speech "I Have a Dream." His height was 5'7".
14. Vladimir Putin is the current President of Russia. He is well known in Russia for his strength and interest in outdoor adventures. His height is 5'7".
15. Sergey Brin is a co-founder of Google. He is currently responsible for many of the Google inventions currently being created. His height is 5'8".

APPENDIX I
Notification of Approval by the Bard College Institutional Review Board

Bard College

Institutional Review Board

Date: November 11, 2013
To: Emily Harris
Cc: Stuart Levine
From: Michelle Murray
Re: How Does Cognitive Dissonance Relate to Prejudice

DECISION: APPROVED

Dear Emily,

The Bard Institutional Review Board reviewed your proposal at our November meeting. Your proposal is approved through November 11, 2014.

Please notify the IRB if your methodology changes, or unexpected events arise.

We wish you the best of luck with your research.

Michelle Murray
mkmurray@bard.edu
IRB Chair

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