OPENNESS TO EXPERIENCE, STRENGTH OF SENSE OF SELF, AND COGNITIVE DISSONANCE IN A COUNTER-ATTITUDINAL ADVOCACY PARADIGM

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ABSTRACT

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The study was designed to investigate whether personality variables, especially the strength of individuals' sense of self, moderated dissonance reduction behavior in a counter-attitudinal advocacy paradigm. The study included 165 undergraduate participants in a laboratory sample and 182 in an online sample. The participants in both samples completed a series of personality measures before writing a counter-attitudinal essay in favor of a proposed tuition increase. The results indicated that the manipulation of perceived choice had an effect on participants' attitude toward the proposed tuition increase over and above their pre-attitude and personality traits. On the other hand, some personality traits were found to be associated with the final attitude. The strength of participants' sense of self negatively predicted their final attitude across conditions after the initial-attitude was controlled; similarly, the participants' degree of psychological discomfort also negatively predicted their final attitude and the amount of attitude change. In addition, openness to experience was found to be associated with prospective cognitive dissonance (i.e., disagree to write the counter-attitudinal essay) for the topic of a diagnostic exam, but not for the topic of a tuition increase, when a face-to-face social present was absent. Moreover, the linguistic content analyses of the participants' essay

writings revealed that certain types of words were used more frequently in certain dissonance conditions (e.g., words of positive emotion/optimism were used more frequently in high-choice compliance condition). Limitations and future directions of the study were also discussed.

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CHAPTER 1

INTRODUCTION

A year ago, when I was chatting with a friend of mine about my dissertation idea on the topic of cognitive dissonance, I explained to him that “cognitive dissonance” is a psychological term which refers to a process by which people’s attitudes can change after they agree to perform a counter-attitudinal action for insufficient reasons. After my explanation, he thought a few seconds and then told me that he had an interesting experience that might be relevant to this process.

Years ago, he was a door-to-door salesman who sold computers and their accessories. His company had two different strategies for selling these products. The first strategy was to tell customers that they just had to pay a little bit more to own the computers and their accessories. The other strategy gave them the opportunity to test the accessories for a month before deciding to purchase them. During a follow-up session, it turned out that customers who bought everything up front (i.e., the first strategy) reported feeling more satisfied with their purchases. On the other hand, those who “tried out” the accessories before purchasing them (i.e., the second strategy) reported feeling less satisfied with them when compared to the other customers and were more likely to return the accessories following the trial period.

Although the exact same products were used in each strategy, people appeared to have different reactions to them that depended upon the sales strategy that had been used. It seems that the customers who decided to buy the products up-front had found more reason to appreciate them, whereas the customers who decided to “test” the products before deciding to purchase them had more time to look for flaws without committing themselves to a final purchase decision. In other words, the customers who did not have to make a financial commitment right away were able to evaluate the accessories more critically and come up with

reasons to decide against buying them. Those who made their purchases up-front, however, had to live with their decision regardless of the actual quality of the products—a situation that should have induced more cognitive dissonance that needed to be reduced by finding value in the products that they had agreed to purchase for "just a little more" than the competitors' products.

Although the company did not conduct an actual experiment with proper controls, these anecdotal “findings” are still of interest. The customers’ attitudes toward the products seemed to shift toward to the positive or negative side based on the choice that was made in the very beginning, when they first received the products.

“Cognitive dissonance” is a frequent occurrence in our daily life. Although it has been studied very thoroughly during the past six decades, it is still a compelling topic that is worthy of researchers’ attention. When I conducted a search using the key words “cognitive dissonance” in the PsycINFO database, my search turned up 820 articles. However, when I searched for articles using the conjunction of the key words “cognitive dissonance” and “personality,” only seven relevant articles were identified in the database. The ratio suggests that less than 1% of the studies of cognitive dissonance have also investigated individuals’ personality traits. Although this small ratio may be due to the specific “key words” used in the search, the inescapable conclusion is still that very few studies of cognitive dissonance have also taken individuals’ personality traits into account.

Individual differences might, however, be quite important in moderating the strength of dissonance effects. Although cognitive dissonance is a common occurrence in most people’s everyday life, the magnitude of the dissonance they experience may nonetheless differ from one person to another. The purpose of the current study is to investigate the relationships between personality traits and cognitive dissonance in a counter-attitudinal advocacy paradigm, with a special focus on the traits of *openness to experience* and strength of *sense of self*. The details and conceptual rationales of the proposed studies are provided below.

1.1 Cognitive Dissonance (Psychological Discomfort as a Mediator)

Festinger (1957) proposed that a psychological state of "cognitive dissonance" occurs when two inconsistent cognitions are present in one's conscious awareness at the same time. This state of cognitive dissonance is assumed to be experienced as psychological discomfort, and in order to diminish or decrease this discomfort, the individual is motivated to engage in strategies that have the potential to reduce the dissonance. A number of research paradigms have been designed to create and subsequently measure the amount of cognitive dissonance experienced by research participants. The four following paradigms have been used most frequently when studying this phenomenon.

1.1.1 The Induced Compliance Paradigm

The "induced compliance" paradigm was first introduced in Festinger and Carlsmith's classic experiment (Festinger & Carlsmith, 1959), in which participants were asked to spend an hour doing "boring" tasks (repeatedly putting 12 spools onto a tray and then emptying the tray during the first half hour of the study, and then continuing by turning 48 square pegs on a board by clockwise quarter-turns during the second half hour). After they had completed these extremely boring tasks, the participants were asked if they would help the experimenter to persuade the next participant (who was actually a confederate) that the tasks they had just completed were interesting and engaging.

Festinger and Carlsmith manipulated the level of justification for helping the experimenter in this manner by giving the participant either $20 (sufficient justification) or $1 (insufficient justification) for agreeing to do this favor[1]. They found that when the participants were asked their personal attitude regarding the experimental tasks afterwards, individuals in the insufficient justification condition reported more favorable attitudes toward the tasks compared to those in the sufficient justification condition. The researchers concluded that

[1] Note that the original study was done in 1957, so the effect of inflation has to be considered here.

individuals in the insufficient justification condition had to change their attitude in order to reduce their psychological discomfort ("I just spent an hour of my time doing boring and pointless tasks for a lousy dollar") whereas individuals in the sufficient justification could attribute their counter-attitudinal behavior (lying) to the financial reward.

1.1.2 The Effort Justification Paradigm

The second major research paradigm used to study cognitive dissonance relies on the assumption that individuals will amplify the desirability of a certain goal when they have to engage in an unpleasant activity in order to achieve that goal. The first classic experiment of this type was performed by Aronson and Mills (1959), who manipulated the level of severity of an “initiation” activity. They had participants undergo either a severe or mild "initiation" in order to become a member of a sexual topics discussion group. In the severe-initiation condition, the individuals engaged in an embarrassing initiation activity (reading obscene words and descriptions aloud) before joining the group. In the mild-initiation condition, the individuals engaged in a less embarrassing activity (reading words that were related to sex but were *not* obscene) before joining the group. The group turned out to be dry and boring, an outcome that should have been particularly dissonant for the individuals in the severe-initiation condition; and, as predicted, these individuals subsequently rated the group as more interesting compared to the individuals in the mild-initiation condition, presumably to reduce their greater level of dissonance about joining it.

1.1.3 The Free-Choice Paradigm

The free-choice paradigm was developed by Brehm (1956), who asked participants to rate a series of common goods and then told them that they were allowed to pick one of two goods to take home as a gift. Participants in the low-dissonance condition had to choose between the items rated second and sixth, whereas participants in the high-dissonance condition had to choose between items rated second and third. The participants were asked to rate all of the items again afterwards. Brehm found that the rating of the chosen item increased

whereas the rating of the rejected item decreased, relative to the participants' initial rating. This effect has been found in four-year old children, in monkeys (Egan, Santos, & Bloom, 2007), and even in pigeons (Zentall, 2010). Brehm proposed that greater dissonance occurs when individuals have to make a difficult choice rather than an easy choice, and that a logical way to reduce this dissonance is to increase one's preference for the selected item and to decrease one's preference for the unselected item.

1.1.4 The Selective Exposure Paradigm

In the selective exposure to information paradigm, participants are usually asked to make a difficult decision between two equally attractive things, such as consumer goods or political plans, and are then provided with several pieces of information that either support or contradict their choice. Afterwards, they are instructed to select pieces of information that they would like to read and consult in more detail. The results of relevant studies have revealed that participants are more likely to select information that is consistent with the choice they have already made (Frey, 1986; Jonas, Schulz-Hardt, Frey, & Thelen, 2001). This finding suggests that one way to reduce dissonance about giving up an equally desirable alternative is to selectively view information that supports one's decision to choose the other (equally desirable) alternative instead.

Although other paradigms exist, the four mentioned above have been the most widely applied in cognitive dissonance studies. Across these different research paradigms, the results reveal consistent patterns—individuals who commit to certain behaviors that oppose a particular attitude are more likely to exhibit cognitive dissonance and to perform dissonance-reducing behaviors, when compared to individuals who do not commit (or have less commitment to) those inconsistent behaviors.

The traditional view of cognitive dissonance proposes that the dissonance-reduction effect is driven by individuals' "psychological discomfort," and that this discomfort is caused by the simultaneous presence of two opposing cognitions in conscious awareness. In order to

reduce this discomfort, individuals usually engage in certain attitude, belief, or (less frequently) behavior changes to achieve greater consistency between the two cognitions (Elkin & Leippe, 1986; Elliot & Devine, 1994). However, not everyone might have cognitive dissonance or experience the same amount of dissonance in the same situation. Some individual difference factors must be considered as well.

For example, a study by Kruglanski (1989) demonstrated that individuals with a high need for closure were more likely to apply dissonance-reduction strategies than individuals with a relatively low need for closure. Similar results were found for individuals with high cognitive complexity compared to those with low cognitive complexity (Harvey, 1965). On the other hand, Stalder and Baron (1998) found that individuals who tended to make external justifications of behavior were less likely to apply dissonance-reduction strategies than were those who tended to make internal justifications. Finally, Matz, Hofstedt, and Wood (2008) found a moderated effect of extraversion on dissonance and dissonance reduction. They found that introverts were more likely than extraverts to experience dissonance discomfort and attitude change when exposed to disagreeing others. Overall, then, there is evidence that individual differences are related to the phenomenon of cognitive dissonance, either as first-order "main effect" predictors or as moderators.

Other individual difference moderators of cognitive dissonance involve the notion of "self." The first of these moderators was proposed in Aronson's (1968) "self-consistency theory." Aronson (1968, 1999) proposed that the degree of experienced dissonance is driven by the discrepancy between individuals' behaviors (e.g., lying to others) and their core beliefs about self (e.g., I am a good person) instead of the simple incompatibility between two opposing cognitions (e.g., I said the task was "exciting" but actually it was "boring").

In one test of this idea, Stone, Aronson, Crain, Winslow, and Fried (1994) asked participants to give a persuasive speech advocating safe sex either publicly or privately and also manipulated whether or not their own unsafe sex experience in the past was made salient

(a failure to use condoms in the past). Making this previous "hypocritical" experience salient should have threatened the individuals' self-image. The researchers then measured the participants' likelihood of having safe sex in the future (likelihood of purchasing condoms) afterwards. The results indicated that participants whose previous unsafe sex had been made publicly salient showed a greater tendency to purchase more condoms than the participants in the other three conditions. In other words, the *hypocrisy* condition elicited the strongest cognitive dissonance-reduction effects, which suggests that the greater the discrepancy between individuals' behaviors and their core beliefs about self, the greater the level of dissonance.

The second self-relevant dissonance theory derives from Steele's (1988) "self-affirmation" theory. Self-affirmation theory proposes that dissonance is driven by the motivation to maintain an overall image of "self-integrity" rather than to reduce the inconsistency between two opposing cognitions or between the behaviors people engage in and their core beliefs (e.g., Harmon-Jones, 2000; Steele & Liu, 1983; Steele et al., 1993). Or, to describe the central tenet of self-affirmation in Cooper's (2007) words, "Inconsistency per se is not the motivator for change. Inconsistency is simply a vehicle that can create a threat to the self-system and the person takes measures to protect it (p. 98)."

As an example, imagine two students. The first, who knows that he is good at math, receives a "C" on a math test. The second, who wants to do well in math but has not been highly successful in the past, also receives a "C." Which of the two will be more likely to question his *overall* ability and view this failure as a threat to his self-concept? According to self-affirmation theory, the one without much successful experience will be threatened more because he does not have enough previous success (i.e., self-resources) to discount the current unsuccessful outcome, whereas the one with a history of successful experience may see this failure as an exception. Having a history of successful experience is an example of the kinds of self-resources upon which the first student can draw.

Steele and Liu (1983) conducted a study in which students were required to write an essay in favor of a tuition increase at their university. They recruited two groups of students; one group was valued-oriented (viewed aesthetic-values as very important) and the other was non-valued-oriented (viewed aesthetic-values as unimportant). In both groups, the participants filled out an aesthetic-values scale after writing the counter-attitudinal essay but before reporting their attitude. The results indicated that filling out the scale eliminated the need to reduce dissonance for the valued-oriented participants but not for the non-valued-oriented participants. Thus, it appears that affirming certain important aspect of ones' self-concept can eliminate (or at least reduce) the amount of dissonance because the activated self-worth system is able to protect individuals' self-integrity without the need for them to change their attitude.

Overall, self-affirmation theory suggests most people are motivated to see themselves as good individuals, and that any information to the contrary will threaten their self-integrity. When people feel that they have chosen to engage in an action, such as writing a counter-attitudinal essay, that threatens their sense of self-integrity, high self-esteem individuals may be able to reduce their feeling of dissonance by recalling previous experiences—even apparently irrelevant ones—that affirm their self-worth (what self-affirmation theory refers to as self-resources). In contrast, low self-esteem individuals may lack sufficient self-resources to maintain their self-integrity, and therefore have to reduce their dissonance by other strategies, such as changing their attitude to match their behavior.

In most situations, "self-affirmation" theory and "self-consistency" provide similar predictions with different explanations. For example, in Brehm's (1956) free-choice paradigm, the increased rating of the chosen item occurs because self-consistency theory predicts that making a bad choice is inconsistent with most people's (positive) self-image; therefore, the chosen item must be *better* than the non-chosen item if self-consistency is to be maintained. On the other hand, according to the self-affirmation theory, individuals engage in dissonance-reduction strategies when they perceive the behavior as a threat to their overall self-integrity.

Hence, increasing the rating of the chosen item is the way to restore the individuals' overall self-integrity, because choosing a non-preferred item without a sufficient reason would threaten one's positive view of oneself (Nail, Misak, & Davis, 2004).

When do these two theories make different predictions? When the individuals' self-esteem is salient. Self-consistency theory predicts that individuals should be more likely to engage in dissonance-reduction strategies if they are *high* in self-esteem because high self-esteem individuals who engage in dissonant acts suffer from a greater perceived self-discrepancy when compared to individuals with low self-esteem. In contrast, self-affirmation theory predicts that individuals with high self-esteem should be *less* likely to use dissonance-reduction strategies because they generally have greater self-resources to deal with their threatened sense of self-integrity.

There has been some research that supports self-affirmation theory over self-consistency theory when the predictions involve self-esteem. Tesser and Cornell (1991) found that as the salience of individuals' positive self-evaluations increased, their motivation to reduce dissonance decreased. Similarly, Steele, Spencer, and Lynch (1993) reported that when self-esteem was salient, low self-esteem individuals, when compared to high self-esteem individuals, were more likely to rationalize their counter-attitudinal behavior by using the dissonance-reduction strategy (i.e., by displaying greater attitude change). Finally, Nail, Misak, and Davis (2004) reported that high self-esteem individuals expressed less dissonance-reduction than did low self-esteem individuals when responding to a situation in which a friend stood up a date. In their study, they found that individuals with high self-esteem would still consider a friend who stood them up (either with or without sufficient reasons) as their good friend, whereas individuals with low self-esteem would consider the friend as a relatively bad one even if he or she had a sufficient reason. In other words, these findings tend to uphold the "self-affirmation" theory prediction that individuals with *low self-esteem* may be more likely to

use dissonance-reduction strategies (e.g., changing their attitude), compared to individuals with high self-esteem, in order to maintain their “self-integrity.”

In summary, self-consistency theory focuses on a reference point for comparing one’s current counter-attitudinal act with one’s own personal attitude or value, whereas self-affirmation theory emphasizes a cognitive meta-structure that motivates the individual to maintain his self-integrity (Fischer, Frey, Peus, & Kastenmueller, 2008). Both of these theories involve the concept of “self,” but self-affirmation theory has proved to make better predictions about dissonance effects that are moderated by individual differences in self-esteem.

As we have seen, self-affirmation theory argues that high-esteem people have greater “self-resources (more favorable self-concepts)” that they can use to maintain their self-integrity without applying dissonance-reduction strategies, whereas self-consistency theory argues that high self-esteem individuals have higher self-reference points which cause them to perceive larger self-discrepancies, which they are then more motivated to reduce by using dissonance-reduction strategies. However, what happens if someone does not have a clear and strongly-defined self-concept in these study situations? If certain individuals do not have a clearly defined self-concept, they may be unable to set up a reference point for comparing their self concept with their current behavior; in addition, they may also have trouble in searching for and applying self-resources to achieve self-integrity because of their lack of a strong and definite self-concept. Comparing the dissonance reduction of individuals with a "weak" versus "strong" sense of self therefore sounds like a promising research direction, as the following background and conceptual rationale reveals.

1.2 Sense of Self (SOS) as a Potential Moderator of Dissonance Reduction

The American Psychiatric Association (APA) has proposed ten discrete personality disorders, one of which is Borderline Personality Disorder (BPD; American Psychiatric Association, 1994; Lieb, Zanarini, Schmahl, Linehan, & Bohus, 2004; Tryon, Devito, Halligan, Kane, & Shea, 1988). BPD is characterized by intense and general instability in mood and

interpersonal relationships, and by a marked degree of identity disturbance, which is often defined as a fragile “sense of self” (American Psychiatric Association, 1994). People with a weak sense of self have only a vague and tenuous sense of who they are; they often report feeling uncertain about themselves; and they often rely on others to help them clarify their feelings and to make decisions. In contrast, people with a strong sense of self have a strong, definite sense of who they are; they understand themselves well, and they can make decisions on their own without relying on others (Kernis, 2005). Flury and Ickes (2007) developed a 12-item scale, called the Sense of Self Scale (SOSS), to measure individuals’ strength of sense of self.

When viewed in terms of self-consistency theory, people with a strong sense of self should have strong and well-defined self-concepts and should therefore be more likely to perceive a discrepancy between their counter-attitudinal act and their self-values; in contrast, individuals with weak sense of self should find such discrepancies more difficult to detect. On the other hand, when viewed in terms of self-affirmation theory, individuals with a strong sense of self, similar to individuals with high self-esteem, may have greater self- resources (a positive and strong self-concept) that can be applied to defend against threats to the self and maintain self-integrity, instead of engaging in dissonance-reduction strategies. In contrast, individuals with a weak sense of self, who lack well-defined self-concepts to use as self-resources, should be more likely to depend on dissonance reduction by changing their attitude to "fit" their recent counter-attitudinal behavior.

Because previous research findings suggest that self-affirmation theory better predicts the use of dissonance-reduction strategies (Nail et al., 2004; Tesser & Cornell, 1991; Steele et al., 1993), I have based my predictions on self-affirmation theory. Specifically, I predict that in a counter-attitudinal advocacy paradigm (a form of the induced compliance paradigm), individuals with strong sense of self should exert *less* external effort to reduce their cognitive dissonance because they have greater self-resources to use to maintain their self-integrity. In contrast,

individuals with weak sense of self should experience a greater motivation to reduce the dissonance by adopting a more favorable attitude toward their counter-attitudinal advocacy, because their self- resources may be insufficient to maintain their self-integrity in the absence of such dissonance reduction. My specific hypotheses are listed below.

Hypothesis 1:

Before investigating how personality variables might moderate dissonance effects in a counter-attitudinal advocacy paradigm, it is important to first make sure that the manipulation of dissonance has its usual effect. That is, participants in the high-choice condition (dissonance condition: having a perceived choice to consent or refuse to write the counter-attitudinal essay) should show greater dissonance reduction, (i.e. report a more positive attitude toward the target proposal) compared to those in the low-choice condition (forced condition: having to write the counter-attitudinal essay without any perceived choice) or the free-choice condition (control condition: being free to express one's own opinions), after controlling for individual differences in personality variables (Big Five, need for cognition[2], self-esteem, subclinical narcissism, contingencies of self-worth[3], and sense of self).

Hypothesis 2:

Sense of self should moderate the effect of cognitive dissonance. Specifically, the strength of individuals' sense of self would be negatively correlated with the amount of dissonance-reduction (increased positive attitude toward the event) in the high-choice condition

[2] According to Cacioppo and Petty (1982), need for cognition is defined as individuals' intrinsic motivation to engage in effortful thinking. Individuals with a high level of need for cognition tend to engage in information seeking and analysis, whereas individuals with a low level of need for cognition are more likely to depend on authority and simple heuristics (such as changing one's attitude to "fit" one's behavior) when dealing with problems. Therefore, need for cognition was also assessed as a potentially relevant covariate when testing the usual effect of the manipulation of cognitive dissonance on attitude change.

[3] The traits of subclinical narcissism (Ames, Rose, & Anderson, 2006) and contingencies of self-worth (Crocker, Luhtanen, Cooper, & Bouvrette, 2003) were also measured and controlled in the model as the committee's suggestions. Subclinical narcissism is a trait that reflects thoughts of their processes involving a grandiose but fragile sense of self as well as entitlement. Individuals who are high in narcissism may preoccupy themselves with conspicuous success and admiration from others (Morf & Rhodewalt, 2001). On the other hand, contingencies of self-worth focus on several internal and external sources of self-esteem, and research of CSW has revealed that the sources of self-worth are more important than whether the overall self-worth is contingent or not (Crocker et al., 2003). These two measures of subclinical narcissism and contingencies of self-worth may be therefore relevant to individuals' "self" and worthy to investigate in this study.

(dissonance condition). The rationale for this prediction was that individuals with a strong sense of self are more likely to possess rich self- resources to help maintain self-integrity rather than use the dissonance-reduction strategies when asked to write a counter-attitudinal essay with apparent choice. In contrast, individuals with a weak sense of self are presumed to lack such self- resources; therefore, they should be more likely to reduce their dissonance by adopting a more positive attitude to the target proposal after consenting (with perceived choice) to write the counter-attitudinal essay. However, in the low-choice and control conditions, the feeling of dissonance should be less likely to occur, and sense-of-self scores should be unrelated to the participants' attitude change scores in these conditions.

Hypothesis 3:

Traditionally, cognitive dissonance theory has viewed the action of reducing dissonance, such as changing one's attitude, as motivated by the "psychological discomfort" that is caused by having two inconsistent cognitions present in one's conscious awareness at the same time. On the other hand, self-affirmation theory views dissonance reduction as a way to help individuals maintain their self-integrity, especially when the individuals lack self-resources. Hypothesis 3 predicts that individuals in the high-choice group (dissonance group) should change their attitudes more than individuals in the low-choice group (forced to write a counter-attitudinal essay), and this relationship should be mediated by the degree of "psychological discomfort." However, sense of self should moderate the relationship between psychological discomfort and attitude change. That is, although the dissonance manipulation (high- and low-choice condition) *per se* should affect individuals' psychological discomfort regardless of the strength of their sense of self, this psychological discomfort should result in more attitude change for individuals whose sense of self is weak rather than strong. This may be because individuals with a strong sense of self can maintain their self-integrity by recalling their own self-resources, whereas individuals with weak sense of self would have to use "external" dissonance-reduction strategies to maintain the integrity.

Hypothesis 4:

Besides the dissonance-reduction strategy of changing one's attitude, Hardyck and Kardush (1968) proposed another strategy of dissonance reduction, "cognitive restructuring," which refers to changing one or more "additional" cognitions rather than changing one of the two main inconsistent cognitions induced in cognitive dissonance paradigms. Festinger (1957) also noted yet another mode of dissonance reduction, "trivialization." By convincing oneself that the counter-attitudinal act is unimportant, the dissonance induced by this act can be alleviated. In support of this idea, Simon, Greenberg, and Brehm (1995) found that participants used trivialization rather than changing their attitude to reduce dissonance when the opportunity to trivialize the target proposal was provided *before* measuring attitude change. Similarly, Steele and Liu (1983) found that after affirming an important aspect of their self, individuals use trivialization rather than attitude change to reduce dissonance if the importance of the counter-attitudinal act was rated *before* attitude rating occurred. In addition, Martinie and Fointiat (2006) reported that trivialization was an efficient strategy people with low self-esteem use to reduce their cognitive dissonance, but was not sufficient for people with high self-esteem.

Overall, the findings from these studies indicate that trivialization is another potential strategy of dissonance reduction if it is available before the attitude changes. Therefore, I hypothesized that in the high-choice condition (dissonance condition), when individuals are asked how important the target proposal (i.e., proposed tuition increase) is to them *before* their final attitude rating occurred, the individuals with weak sense of self should adopt the strategy of trivialization to reduce dissonance and therefore not need to change their attitude. In contrast, if the importance items are assessed *after* the attitude measure, the individuals with a weak sense of self should change their attitude more rather than trivialize the importance of the target proposal. Finally, individuals with a strong sense of self should be less likely to trivialize the event and also less likely to change their attitude regardless of the order of questions, because their self-system provides them with enough resources to maintain their integrity. Therefore,

they are less likely to adopt external strategies of dissonance reduction compared to individuals with a weak sense of self.

1.3 Prospective and Retrospective Cognitive Dissonance

Writing a counter-attitudinal essay is an unusual experience. In their lives outside the laboratory, people are rarely asked to write an essay in support of a position that is the opposite of their true attitude. In a traditional counter-attitudinal advocacy study, once individuals have complied by writing a counter-attitudinal essay, they presumably experience "retrospective" dissonance and engage in dissonance-reduction strategies in order to relieve the discomfort caused by the dissonance. However, some individuals may be able to avoid experiencing retrospective dissonance because they declined to write the counter-attitudinal essay in the earlier stage of the study when they already experienced what might be termed "prospective" cognitive dissonance. Previous research has focused almost entirely on the retrospective dissonance effect but has paid little attention to what I am calling the prospective dissonance effect. Perhaps in the standard laboratory study, with the experimenter present to help induce the participant's compliance, participants are less likely to refuse to write a counter-attitudinal essay, so the sample sizes of non-compliers are small.

However, without the external pressure, not everyone would be willing to write such a counter-attitudinal essay. Although this issue has, to my knowledge, not been addressed in previous dissonance research, it was one that emerged when I attempted to explore the possibility of translating a counter-attitudinal advocacy study into the format of an *online* survey study. The results of the pilot study I conducted suggested another individual difference variable relevant to dissonance—openness to experience— that was also worth pursuing in the present research.

1.4 Openness to Experience as a "Filter" for Counter-Attitudinal Advocacy

As noted above, in addition to piloting my procedure for the current study in the standard laboratory setting, I also piloted it using an on-line survey study format in which participants were asked to write a counter-attitudinal essay that supports an (ostensible) proposal by the department of psychology to implement a senior-year diagnostic exam, and to do so on-line with no experimenter present. In this online survey format, participants first were randomly assigned to one of three conditions (low-choice, high-choice, and control conditions). In the low-choice condition, participants were required to write a counter-attitudinal essay to support this exam without being given the perception of having any choice; whereas in the high-choice condition, participants were requested to write the counter-attitudinal essay with a choice about whether to do that or not (but without the presence of the experimenter to apply any social pressure). Finally, in the control condition, participants could write down their own arguments freely and without any constraint.

The results of my online pilot study (N = 196) revealed that, in the high-choice condition, only about 30% of the participants chose to write a counter-attitudinal essay in support of the proposed diagnostic exam, whereas about 70% of the participants refused to write the counter-attitudinal essay and chose to write an essay in which they opposed to have this exam instead. When I examined the individuals who made these different choices in the high-choice condition of my online study, I found that the individuals who agreed to write the counter-attitudinal essay were more open to experience compared to those who declined to write the counter-attitudinal essay, r (111) = .22, p < .025. In other words, the individuals who were closed to experience were more likely to refuse to write the counter-attitudinal essay when it was easy for them to decline to do so.[4]

[4] A different possible interpretation of this finding is that people who were open to experience also possessed more positive attitudes toward the proposed diagnostic exam, making them more likely to agree to write the essay, whereas those who were closed to experience had more negative attitudes and were therefore more likely to decline to write the counter-attitudinal essay. However, in the on-line pilot study, openness to experience did not correlate with the participants' attitude toward the diagnostic exam in either the control condition or the low-choice condition; r (35) =.06, p

This finding suggests the interesting possibility that people who are "closed to experience" experience a stronger *prospective* state of cognitive dissonance that occurs as soon as they are asked to write a counter-attitudinal essay. If it is easy for them to decline the request, they will do so, because that is the easiest way from them to reduce the prospective dissonance that has been evoked. On the other hand, people who are open to experience are, by definition, willing to entertain new ideas and engage in new behaviors, presumably even counter-attitudinal ones, a willingness which implies that they are also open to trying out new ideas, taking a new view of things, changing their previously-held attitudes, changing their previously-displayed behavior, or doing some or all of these.

Note that, this same effect did not occur in the standard laboratory study that I pilot-tested, in which following the “social pressure” I applied, 100% (21 out of 21 participants) agreed to write the counter-attitudinal essay. In the absence of such direct social pressure (i.e., in the online version of the study), one's openness to experience appears to act as a “filter” variable that leads some individuals to accept, and other individuals to decline, the request to write a counter-attitudinal essay in the absence of any direct social pressure to do so.

To see if I could replicate and extend this finding in the current study, the online survey format was again used to reduce the pressure of compliance evoked by the face-to-face presence of an experimenter. The participants in the online study were asked (but not required) to write counter-attitudinal essays on two different topics— a proposed “senior year diagnostic exam implemented for each major” and a proposed tuition increase. The order in which the participants wrote the two essays was counterbalanced. I expected the results to reveal that participants who were more open to experience would be more likely to agree to write the counter-attitudinal essays on both topics, whereas participants who were more closed to experience would be less likely to agree to do so. Hence, *Hypothesis 5* was that;

= .715 and r (40) = .03, p = .875, respectively. Openness was also not related to the attitude within the subset of participants who “agreed” to write the counter-attitudinal essay in high-choice condition, r (29) =.16, p = .403, nor within the subset of participants who “disagreed” to write the counter-attitudinal essay, r (77) = .09, p = .402.

In an online version of the study in which all participants were asked, but not required, to agree to write counter-attitudinal essays, as the level of the openness to experience increases, individuals should be more likely to *comply* with the request to write a counter-attitudinal essay. Or, to state the same prediction in other words, as their level of openness to experience decreases, individuals should be more likely to *decline* the request to write the counter-attitudinal essay, regardless of the topics (diagnostic exam or tuition increase).

CHAPTER 2

METHODS

2.1 Participants

The current project included two studies. One study was conducted in the lab using the traditional counter-attitudinal essay paradigm (to test Hypotheses 1 to 4). The second study was conducted as an online survey study (to test Hypothesis 5).

The laboratory study involved 168 undergraduate students who were enrolled in introductory-level psychology courses at the University of Texas at Arlington in the Spring 2011 semester. The data provided by 165 of the 168 participants were included in the following analyses. Of the three participants whose data were excluded, one did not follow the study instructions and withdrew from the study in the early stage, one only completed 30% of the personality surveys and failed to complete the final attitude measure, and one confessed that he had heard the details of the study before participating. The final 165 participants included 44 males (26.7%) and 121 females (73.3%). Proportions based on ethnic backgrounds were 32.7% White/Anglo-American, 18.2% Black/African-American, 23.6% Latino/Hispanic-American, 18.2% Asian/Asian-American, 1.2% Pacific Islander, and 6.1% other/multiracial. Proportions based on academic classification were 46.7% freshman, 24.8% sophomore, 16.4% junior, 9.1% senior, and 3% fifth-year or others. The average age was 21.42 (*SD* = 5.79) excluding the six participants did not provide their age.

The participants were recruited by the SONA experiment tracking software system via the Internet (students could choose from a list of available studies the ones they would like to participate in). Each participant received 1.5 experimental participation credits (corresponding to an hour of participation), which counted towards the experimental participation credits that all students were required to obtain for their introductory-level psychology classes. All students

were given the option of fulfilling this requirement in the alternative way of reading short, research-focused articles and writing summary reactions to them.

There were four conditions in the laboratory study: (1) control condition, in which participants were free to write their own opinions regarding the proposed tuition increase, followed by the attitude measure; (2) low-choice condition, in which participants were forced to write the counter-attitudinal essay to support the proposed tuition increase with no perception of having any choice before they then reported their attitude; (3) high-choice with attitude/trivialization measures condition, in which the participants were asked to write the counter-attitudinal essay while perceiving that they had chosen to do so, before they then completed the attitude measure followed by the trivialization measure (importance of the event); and (4) high-choice with trivialization/attitude measures condition, which was the similar to condition (3) with the single exception that the trivialization measure was taken before attitude measure.

The 165 participants were randomly assigned to each of the four conditions of the laboratory study. Thirty-eight participants were in the control condition, and 39 participants were in the low-choice condition. Forty-six participants were assigned to the high-choice with attitude/trivialization measures condition (in which 39 participants complied to write the counter-attitudinal essay but seven did not comply and chose to write the essay against the proposed tuition increase). Forty-two participants were in the high-choice with trivialization/attitude measures condition (in which 38 participants complied but four did not).

My tests of Hypothesis 1 and 2 required the data for the participants in the control condition, the low-choice condition, and the high-choice with attitude/trivialization condition, whereas my test of Hypothesis 3 required the data for only the participants in the low-choice and high-choice with attitude/trivialization condition. Finally, my test of Hypothesis 4 required the data for only the participants in the two high-choice conditions (attitude/trivialization and trivialization/attitude).

To complement the data obtained in the laboratory study, data from 196 participants were collected in the online version of the study. Nine of the 196 participants did not take the survey before the deadline; three participants declined to participate in the study after reading the consent form; and two of the participants withdrew in the early stage and completed less than 50% of the survey. These data were therefore excluded from the online study, resulting in a final sample size of 182. Each participant was asked to respond to the personality measures first and then was asked to write *two* counter-attitudinal essays on different topics (a proposed UTA tuition increase and a proposal that each department at UTA implement a mandatory senior-year diagnostic exam) in the counter-balanced order, followed by the measure of their subsequent attitude toward the issue in question. The survey required about 60 minutes to complete, and one experimental participation credit (corresponding to an hour of online participation) was granted for this participation.

Of the 182 participants, 17 of them (9.3%) declined to provide essays for both topics; seven (3.8%) provided an essay for the topic of tuition increase but not for the topic of diagnostic exam; five and (2.7%) provided an essay for the topic of the diagnostic exam but not for the tuition increase. The remaining 153 participants (84.1%) provided essays for both topics.

The 182 participants included 42 males (23.1%) and 139 females (76.4%), and one participant who did not report his or her gender. Proportions based on ethnic backgrounds were 37.6% White/Anglo-American, 17.1% Black/African-American, 17.1% Latino/Hispanic-American, 19.3% Asian/Asian-American, 0.6% Pacific Islander, and 8.3% other/multiracial. Proportions based on academic classification were 38.1% freshman, 27.1% sophomore, 19.9% junior, 11.0% senior, and 3.9% fifth year or others. The average age was 21.62 (SD = 5.44) excluding the seven participants who did not provide their age.

2.2 Materials

Both the laboratory study and the online study used the same materials, but participants in the online study were asked to respond to two issues (tuition increase and the proposed senior-year diagnostic exam), whereas participants in the laboratory study were asked to respond to one topic (tuition increase) only. In both studies the participants reported their responses using a computer. They were asked to complete (1) items assessing personal background information; (2) the need for cognition scale; (3) a self-esteem measure; (4) measures of the Big Five personality dimensions (extraversion, agreeableness, conscientiousness, neuroticism, and openness) along with a more specific measure of the facets of openness to experience; (5) the contingencies of self-worth scale; (6) the subclinical narcissism measure; (7) the sense of self scale; (8) their written arguments in favor of the counter-attitudinal proposal(s); (9) their rated level of psychological discomfort; and (10) their final ratings of their attitude toward, and the perceived importance of the proposed tuition increase (and the senior-year diagnostic exam in the online version of the study). The sense of self scale was completed right before writing an essay in the laboratory study, and was completed right before writing the first essay in the online study in order to activate each individual's self-concept.

Note that these personality measures may correlate with each other. On the other hand, note that although the measures of sense of self, self-esteem, and contingencies of self-worth were designed to assess aspects of the self, they focus on different aspects of the self. The sense of self measure is designed to assess the strength of individuals' self-concepts (Flury & Ickes, 2007); the self-esteem scale measures one's overall evaluation or appraisal of his/her self-worth (Rosenberg, 1965); and the contingencies of self-worth scale assesses the internal and external sources of self-esteem (Crocker et al., 2003). Thus, although there is some empirical overlap among these measures, in no cases did these measures prove to be largely redundant with each other. Finally, note that, in the current study, because the cover study was

related to academic proposals (i.e., a proposed tuition increase and a proposed senior-year diagnostic exam), only the facet of academic competence from the contingencies of self-worth was used in the data analyses reported below.

2.2.1 Personal Background Information

In section 1 of the online survey, the participants were asked to report their gender and age, and then provide information relevant to their ethnicity and family background (see Appendix A, Part 1).

2.2.2 Need for Cognition

The Need for Cognition scale was developed by Cacioppo and Petty (1982) (see Appendix A, Part 2). This measure includes 18 items, each rated on a 5-point Likert scale that ranges from 1 (extremely uncharacteristic of you [not at all like you]) to 5 (extremely characteristic of you [very much like you]). The ratings for the items were averaged after any negatively-worded statements were reverse-coded. A higher score indicates a higher level of need for cognition. The scale's reliability, measured as a Spearman-Brown split-half coefficient by Cacioppo and Petty (1982), was .87. In the current samples, the internal consistency indicator, Cronbach's α, was .87 in the laboratory study and .88 in the online study.

2.2.3 Rosenberg's Self-Esteem Scale

The students' self-esteem was measured using Rosenberg's Self-Esteem Scale (Rosenberg, 1965) (see Appendix A, Part 3). The scale includes 10 statements that measure how positively an individual evaluates him- or herself. As before, responses to all items were made using a 5-point Likert scale that ranges from 1 (strong disagreement) to 5 (strong agreement). The ratings for the 10 statements were averaged after any negatively-worded statements had been reverse-coded. Higher scores were indicative of higher levels of self-esteem. The reliability of Rosenberg's Self-Esteem Scale has been reported to be in the range from .72 to .88 (Fleming & Courtney, 1983; Wylie, 1989), and in the current research it was .88 in the laboratory study and .89 in the online study.

2.2.4 The Big Five Inventory (BFI)

The participants were also asked to complete the Big Five Inventory (BFI) that was developed by John and Srivastava (1999) (see Appendix A, Part 4). This measure includes 40 items, each rated on a 5-point Likert scale that ranges from 1 (strong disagreement) to 5 (strong agreement). The ratings for the items on each of the Big Five personality dimensions were averaged after any negatively-worded statements had been reverse-coded. Higher scores on each dimension indicate higher levels of the trait in question (extraversion, agreeableness, conscientiousness, neuroticism, and openness to experience). The reported reliabilities (Cronbach's αs) for the five dimensions were: extraversion, .88; agreeableness, .79; conscientiousness, .82; neuroticism, .84; and openness to experience, .81 (John & Srivastava, 1999). In the current samples, following the order of extraversion, agreeableness, conscientiousness, neuroticism, and openness to experience, the corresponding Cronbach's αs were: .84, .79, .79, .82, and .81 in the laboratory study, and were .83, .80, .78, .80, and .81 in the online study.

2.2.5 Openness to Experience of IPIP

The participants were also asked to complete the Openness to Experience Subscale of IPIP-NEO (International Personality Item Pool, NEO version; Goldberg, 1999; see Appendix A, Part 5) in order to investigate the details of Hypothesis 5. This measure included 60 items, 10 items for each facet of openness to experience (imagination, artistic interests, emotionality, adventurousness, intellect, and liberalism). Each item was rated on a 5-point Likert scale that ranged from 1 (strong disagreement) to 5 (strong agreement).

The ratings for the items on each of the facets of openness to experience were averaged after any negatively-worded statements had been reverse-coded. Higher scores on each facet of openness to experience indicated higher levels of the trait in question. The overall reliability of the scale was .90 in the laboratory sample and was also .90 in the online sample. In addition, following the order of imagination, artistic interests, emotionality, adventurousness,

intellect, and liberalism, the corresponding reliabilities for the six facets of openness to experience in the laboratory sample were: .79, .80, .72, .74, .82, and .74; and were .78, .81, .69, .61, .82, and .72 in the online sample. These values are similar to those reported previously by Goldberg (1999): imagination, .83; artistic interests, .84; emotionality, .81; adventurousness, .77; intellect, .86; and liberalism, .86.

2.2.6 Contingencies of Self-Worth Scale (CSWS)

The participants were also asked to complete the Contingencies of Self-Worth Scale (CSW) that was developed by Crocker and her colleagues (Crocker, Luhtanen, Cooper, & Bouvrette, 2003; see Appendix A, Part 6). This measure includes 35 items and assesses 7 facets of the contingencies of self-worth (i.e., family support, competition, appearance, God's love, academic competence, virtue, and approval from others). Each item is rated on a 7-point Likert scale that ranges from 1 (strong disagreement) to 7 (strong agreement). The ratings for the items on each of the CSW dimensions were averaged after any negatively-worded statements had been reverse-coded. Higher scores on each dimension indicated higher levels of the trait in question.

The overall reliability of the CSW scale was .89 in the laboratory study and .87 in the online study. Following the order of family support, competition, appearance, God's love, academic competence, virtue, and approval from others, the corresponding Cronbach's αs were .69, .86, .77, .93, .74, .75, and .81 in the laboratory study, and were .75, .83, .67, .93, .80, .81, and .73 in the online study. The reported reliabilities for the seven dimensions by Crocker et al. (2003) were .84, .87, .83, .96, .82, .83, and .82.

Because the current study used the cover story of a proposed tuition increase and a proposed senior-year diagnostic exam at the University of Texas at Arlington, only the CSW-academic competence subscale was presumed to be relevant to the goals of the current investigation. For that reason, only the score measuring academic-competence in the CSW scale was used as a predictor in the current data analyses.

2.2.7 *16-item Narcissistic Personality Inventory (NPI-16)*

The participants' level of nonclinical narcissism was measured using the 16-item Narcissistic Personality Inventory (Ames, Rose, & Anderson, 2006; see Appendix A, Part 7). The scale includes 16 pairs of statements. Participants were asked to choose the statement from each pair that described them the best. Each narcissistic alternative chosen was coded as 1. The ratings for the items were averaged. Higher scores were indicative of higher levels of subclinical narcissism. The reliability of NPI-16 has been reported to be in the range from .65 to .78 (Ames et al., 2006), and in the current research it was .70 in the laboratory study and .72 in the online study.

2.2.8 Sense of Self Scale

The participants' strength of sense of self was measured with the Sense of Self Scale (SOSS) (Flury & Ickes, 2007) (see Appendix A, Part 8). The scale includes 12 items that measure one's perception of a strongly versus weakly experienced sense of self. Responses to all items were made using a 5-point Likert scale that ranges from 1 (extremely uncharacteristic of me) to 5 (extremely characteristic of me). The ratings for the 12 statements were summed after the negatively-worded statements had been reverse-coded. Higher scores indicate a *weaker* sense of self. Reliability coefficients in the range of .86 have been reported for the 12-item Sense of Self Scale by Flury and Ickes (2007). In the current study, the reliability was .86 in the laboratory sample and .87 in the online sample.

2.2.9 Arguments in favor of the counter-attitudinal proposal

Participants in the laboratory study were randomly assigned to write an essay in one of the following four conditions: (1) control condition—the participants can write their own opinions about the proposed tuition increase freely and without any constraint; (2) low-choice condition—the participants were required (forced, but they can drop out if they really do not want to do it) to write a counter-attitudinal essay that supports the proposed tuition increase; and (3) high-choice with attitude/trivialization measures condition; and (4) high-choice with

trivialization/ attitude measures condition. The only difference between condition (3) and (4) was the order in which the attitude and trivialization measures were completed, as discussed further below. This essay was required to be about 200- to 300-words long, and the participants were required to type their name at the end of their essay in order to increase their perceived responsibility and dissonance regarding negative consequences (Aronson, 1992; Stalder & Baron, 1998).

Participants in the online study were run in the high-choice condition only, but all of the participants in the online study had to write counter-attitudinal essays about both of the two proposals—the proposed university-wide tuition increase and the proposed senior-year diagnostic exam, followed in each case by their completion of the psychological discomfort/affect measure and the final attitude measure (see Appendix A, Part 9-2). The order of the two essay topics was counter-balanced.

2.2.10 Psychological Discomfort/Affect Scale

After they finished writing the essay, the participants were given an assessment of dissonance affect that measured their degree of discomfort.

The Affect Scale (Elliot & Devine, 1994) was used to measure participants' psychological discomfort (see Appendix A, Part 10). This measure includes 24 items of dissonance-relevant terms (e.g. uncomfortable, uneasy) as well as some dissonance-unrelated "filler" terms (e.g. content, guilty). Participants were asked to rate how they felt "right now" using a 7-point Likert scale that ranges from 1 (does not apply at all) to 7 (applies very much). Devine, Monteith, Zuwerink, and Elliot (1994) conducted a factor analysis of the 24 items and concluded that the affect of "discomfort" was composed of the mood adjectives "uncomfortable," "uneasy," and "bothered," with an estimated reliability of .81 (measured as Cronbach's alpha). In the current study, the reliability of the three items was .79 for the topic of the proposed tuition increase in the laboratory sample, and it was .84 for the topic of the proposed tuition increase and was .86 for the topic of the proposed diagnostic exam respectively in the online sample.

2.2.11 Attitude toward (and perceived importance of) the target proposal(s)

Finally, participants were asked to convey their personal attitude toward the target proposal(s) by responding to the single-item measure, "What is your personal opinion regarding the proposed tuition increase/proposed senior-year diagnostic exam?" (Appendix A, Part 11). For these ratings, they used a 9-point Likert scale that ranges from 1 (strongly opposed) to 9 (strongly favorable).

In addition, participants in the high-choice conditions (condition 3 and 4) in the laboratory study were also asked to rate how important this event was to them *personally* and to *the university/general* via six items (see Appendix A, Part 12). Finally, participants in condition 3 (high-choice with attitude/trivialization measures) were asked to report their attitude toward the undesirable event (tuition increase) before reporting their perceived importance of the undesirable event, whereas participants in condition 4 (high-choice with trivialization/attitude) were asked to rate the importance of the event before rating their attitude toward the event. The overall reliability of the six-item trivialization measure was .75.

2.3 Procedure

In the SONA system-based pretest, two questions were asked to assess the participants' original attitude toward the proposed tuition increase and the proposed senior-year diagnostic exam. However, the participants did not have to take the pretest in order to participate in the study (both the laboratory and on-line parts)[5].

The participants' demographic information and personality traits (i.e. Big Five, self-esteem, need for cognition, narcissism, contingencies of self-worth, and sense of self) were assessed at the start of their experimental session. The participants in the laboratory study were then randomly assigned to one of the four groups described above: (1) control condition,

[5] Of the 165 participants in the laboratory study, 160 of them responded to the attitude measures in the pretest. Of the 182 participants in the online version of the study, 148 of them reported their attitudes toward the proposed tuition increase and diagnostic exam issues in the pretest.

(2) low-choice condition, (3) high-choice with attitude/trivialization condition, and (4) high-choice with trivialization/attitude condition.

Once the participants had finished writing their essay, they were given an assessment of dissonance affect that measured their degree of discomfort. After completing this measure, they were asked to report their attitude toward the event. Note again that the participants in condition 3 (high-choice with attitude/trivialization) also reported the importance of the event *after* their attitude report and that the participants in condition 4 (high-choice with trivialization/attitude) reported the importance rating *before* giving their attitude report.

In addition, recall that, in the online survey study, only the "high-choice" condition was run, but each participant in the online study responded to two target proposals—a proposed tuition increase and the proposed implementation of a senior-year diagnostic exam in each department (the order of these two topics was counter-balanced).

All participants in the online study also reported their psychological discomfort and their final attitude after they had written their counter-attitudinal essay about each of the topics (tuition increase and diagnostic exam).

CHAPTER 3

RESULTS

Prior to the data analyses, all variables were examined for missing values, outliers, and instances of non-normality. There were no missing values for the personality variables or for the attitude and trivialization measures in the laboratory sample, and there was less than 3% missing data in the online sample. The reader should note that, 3% of the participants in the laboratory sample did not provide responses to the pre-attitude measures, whereas 19% of the participants in the online sample did not respond to the pre-attitude.

There were few cases of clear-cut univariate outliers. No extreme univariate outliners were found in the laboratory sample; but there was one extreme univariate outlier in the NPI and five extreme univariate outliers on the attitude toward the proposed tuition increase in the online sample. However, because these were not variables of interest in the following analyses, no future action would be taken on these two variables in the online sample.

Finally, the variables of pre-attitude, attitude, and psychological discomfort in both the laboratory and online samples were severely non-normal in their distributions. Data transformations were performed, but did little to improve the shapes of these distributions. Thus, the original non-transformed variables were retained instead to use in the following analyses. Descriptive information about all variables is reported in Table 3.1 and Table 3.2.

Table 3.1 Means, SD, Range of the Variables in the Laboratory Sample

	Control Condition					Low-Choice Condition					High-Choice Condition Attitude/Trivialization (Compliance)					High-Choice Condition Attitude/Trivialization (Non-Compliance)				
	N	Range		*M*	*SD*	*N*	Range		*M*	*SD*	*N*	Range		*M*	*SD*	*N*	Range		*M*	*SD*
		lowest	highest				lowest	highest				lowest	highest				lowest	highest		
Attitude	38	1.00	9.00	4.45	3.24	39	1.00	9.00	4.64	3.06	39	1.00	9.00	5.08	2.68	7	1.00	2.00	1.43	0.53
Pre-Attitude	38	1.00	9.00	4.03	2.43	36	1.00	7.00	3.75	2.09	39	1.00	9.00	4.23	2.36	6	1.00	5.00	3.00	1.41
Attitude Change	38	-4.00	4.00	0.42	2.02	36	-6.00	8.00	0.81	2.94	39	-3.00	7.00	0.85	2.08	6	-4.00	1.00	-1.50	1.87
Personal Trivialization	38	1.00	9.00	6.24	1.93	39	2.67	9.00	6.19	1.70	39	1.67	9.00	6.01	1.74	7	3.33	8.00	6.38	1.65
General Trivialization	38	1.00	9.00	6.33	1.81	39	1.67	9.00	6.16	1.90	39	4.00	9.00	6.42	1.34	7	3.00	7.67	6.19	1.67
Psychological Discomfort	38	1.00	6.00	2.09	1.26	39	1.00	7.00	2.11	1.47	39	1.00	4.67	1.88	1.11	7	2.00	5.33	3.05	1.38
Narcissism	38	0.00	0.81	0.37	0.20	39	0.06	0.88	0.37	0.21	39	0.00	0.63	0.25	0.18	7	0.19	0.56	0.38	0.14
CSW (Family Support)	38	2.00	7.00	5.41	1.07	39	2.80	7.00	5.31	1.04	39	3.60	7.00	5.67	0.90	7	4.80	6.80	5.66	0.75
CSW (Competition)	38	2.00	7.00	5.33	1.17	39	2.40	7.00	5.47	1.11	39	1.00	7.00	5.17	1.30	7	2.40	6.40	5.43	1.40
CSW (Appearance)	38	2.20	7.00	4.91	1.28	39	2.20	7.00	4.77	1.15	39	2.20	6.80	5.03	1.22	7	3.60	6.00	5.11	0.82
CSW (GOD's Love)	38	1.00	7.00	5.02	1.60	39	1.00	7.00	5.27	1.50	39	1.00	7.00	5.20	1.50	7	1.00	7.00	5.60	2.22
CSW (Academic Competence)	38	3.60	7.00	5.61	1.02	39	3.80	7.00	5.76	1.02	39	3.00	7.00	5.72	1.03	7	5.40	7.00	6.23	0.56
CSW (Virtue)	38	2.00	7.00	5.10	1.11	39	2.80	7.00	5.46	1.17	39	2.00	7.00	5.53	1.15	7	4.40	6.80	5.54	0.88
CSW (Others' Approval)	38	1.00	6.00	3.48	1.30	39	1.00	6.40	3.82	1.18	39	1.00	7.00	3.95	1.54	7	1.00	4.60	3.23	1.27
Contingencies of Self-Worth	38	3.43	6.43	4.98	0.76	39	3.57	6.69	5.12	0.73	39	2.77	6.34	5.18	0.80	7	4.43	5.71	5.26	0.49
Need for Cognition	38	2.00	4.50	3.33	0.66	39	2.72	4.67	3.54	0.51	39	2.17	4.83	3.48	0.74	7	2.11	4.33	3.38	0.83
Self-Esteem	38	2.50	5.00	4.13	0.61	39	1.20	5.00	4.07	0.86	39	2.30	5.00	3.89	0.67	7	2.40	4.80	4.17	0.86
Sense of Self	38	1.13	3.69	2.49	0.68	39	1.13	4.13	2.43	0.70	39	1.31	3.63	2.52	0.64	7	1.25	3.19	2.40	0.76
Extraversion	38	1.75	5.00	3.56	0.81	39	1.75	5.00	3.36	0.76	39	2.13	5.00	3.44	0.72	7	2.13	4.00	3.09	0.73
Agreeableness	38	2.78	5.00	3.99	0.63	39	2.22	5.00	3.79	0.67	39	2.00	5.00	3.83	0.64	7	3.22	4.44	3.97	0.40
Conscientiousness	38	2.22	5.00	3.62	0.68	39	2.89	4.89	3.87	0.54	39	2.33	4.89	3.63	0.56	7	3.11	4.56	3.87	0.49
Neuroticism	38	1.00	4.63	2.82	0.89	39	1.50	4.50	2.76	0.65	39	1.50	4.00	2.85	0.73	7	1.75	4.00	2.98	0.77
Openness to Experience	38	2.30	4.90	3.60	0.68	39	2.50	4.80	3.59	0.59	39	2.20	4.80	3.69	0.64	7	2.40	4.40	3.54	0.70

Table 3.1 - continued

	High-Choice Condition Trivialization/Attitude (Compliance)					High-Choice Condition Trivialization/Attitude (Non-Compliance)					Total				
	N	Range		*M*	*SD*	*N*	Range		*M*	*SD*	*N*	Range		*M*	*SD*
		lowest	highest				lowest	highest				lowest	highest		
Attitude	38	1.00	9.00	5.21	2.48	4	1.00	4.00	2.50	1.73	165	1.00	9.00	4.64	2.89
Pre-Attitude	38	1.00	9.00	4.29	1.96	3	1.00	7.00	3.00	3.46	160	1.00	9.00	4.02	2.21
Attitude Change	38	-3.00	5.00	0.92	2.10	3	-3.00	0.00	-1.00	1.73	160	-6.00	8.00	0.63	2.31
Personal Trivialization	38	3.00	9.00	6.70	1.58	4	3.67	6.33	5.17	1.23	165	1.00	9.00	6.26	1.73
General Trivialization	38	4.00	9.00	7.04	1.15	4	4.33	6.33	5.33	1.15	165	1.00	9.00	6.44	1.60
Psychological Discomfort	38	1.00	4.67	1.68	1.08	4	1.00	5.00	2.92	1.69	165	1.00	7.00	2.01	1.28
Narcissism	38	0.00	0.69	0.31	0.16	4	0.19	0.56	0.33	0.18	165	0.00	0.88	0.33	0.19
CSW (Family Support)	38	1.80	7.00	5.28	1.08	4	3.60	5.20	4.60	0.77	165	1.80	7.00	5.41	1.02
CSW (Competition)	38	1.75	7.00	4.95	1.35	4	4.50	6.40	5.28	0.84	165	1.00	7.00	5.24	1.23
CSW (Appearance)	38	2.20	6.80	4.72	1.23	4	2.00	5.20	3.85	1.34	165	2.00	7.00	4.84	1.21
CSW (GOD's Love)	38	1.00	7.00	4.87	2.15	4	4.80	7.00	5.95	0.91	165	1.00	7.00	5.13	1.70
CSW (Academic Competence)	38	3.60	7.00	5.98	0.85	4	5.40	7.00	6.20	0.82	165	3.00	7.00	5.80	0.97
CSW (Virtue)	38	3.20	7.00	5.34	1.00	4	4.20	5.80	5.00	0.67	165	2.00	7.00	5.36	1.09
CSW (Others' Approval)	38	1.00	6.80	3.50	1.57	4	1.00	3.40	2.55	1.06	165	1.00	7.00	3.64	1.40
Contingencies of Self-Worth	38	3.22	6.51	4.95	0.73	4	4.21	5.17	4.78	0.40	165	2.77	6.69	5.06	0.74
Need for Cognition	38	2.50	4.41	3.49	0.53	4	3.28	4.78	3.96	0.72	165	2.00	4.83	3.47	0.63
Self-Esteem	38	2.10	5.00	3.97	0.70	4	4.50	4.90	4.68	0.17	165	1.20	5.00	4.04	0.72
Sense of Self	38	1.25	3.56	2.24	0.59	4	1.56	3.25	2.19	0.76	165	1.13	4.13	2.41	0.66
Extraversion	38	1.13	4.75	3.24	0.81	4	2.38	4.00	3.31	0.68	165	1.13	5.00	3.38	0.77
Agreeableness	38	1.89	5.00	4.04	0.63	4	3.78	4.89	4.28	0.49	165	1.89	5.00	3.92	0.64
Conscientiousness	38	2.22	5.00	3.64	0.63	4	2.22	4.67	3.50	1.06	165	2.22	5.00	3.69	0.61
Neuroticism	38	1.14	4.00	2.85	0.76	4	2.00	4.13	3.03	1.06	165	1.00	4.63	2.83	0.76
Openness to Experience	38	2.00	4.80	3.73	0.67	4	3.60	4.90	4.18	0.56	165	2.00	4.90	3.66	0.64

Table 3.2 Means, SD, Range of the Variables in the Online Sample

Tuition Increase Issue	High-Choice Condition (Complied)					High-Choice Condition (Not Complied)					Total				
	N	Range		*M*	*SD*	*N*	Range		*M*	*SD*	*N*	Range		*M*	*SD*
		lowest	highest				lowest	highest				lowest	highest		
Narcissism	52	0.00	0.69	0.19	0.14	122	0.00	1.00	0.20	0.17	181	0.00	1.00	0.20	0.16
CSW (Family Support)	51	1.20	7.00	5.09	1.19	121	1.60	7.00	5.31	1.00	179	1.20	7.00	5.24	1.06
CSW (Competition)	51	2.40	7.00	4.98	1.16	121	1.60	7.00	4.96	1.19	179	1.60	7.00	4.97	1.19
CSW (Appearance)	51	3.00	6.80	4.76	0.96	121	2.00	7.00	4.88	1.07	179	2.00	7.00	4.87	1.04
CSW (GOD's Love)	51	1.00	7.00	4.69	1.86	121	1.00	7.00	4.87	1.70	179	1.00	7.00	4.84	1.73
CSW (Academic Competence)	51	2.20	7.00	5.24	1.16	121	2.60	7.00	5.37	1.16	179	2.20	7.00	5.32	1.16
CSW (Virtue)	51	2.40	7.00	5.16	1.20	121	2.20	7.00	5.09	1.14	179	2.20	7.00	5.11	1.15
CSW (Others' Approval)	51	1.00	6.00	3.28	1.32	121	1.00	6.20	3.60	1.11	179	1.00	6.20	3.50	1.19
Contingencies of Self-Worth	51	3.29	6.31	4.74	0.74	121	3.11	6.71	4.87	0.69	179	3.11	6.71	4.83	0.71
Need for Cognition	52	1.33	4.44	3.30	0.69	121	1.33	4.89	3.16	0.60	181	1.33	4.89	3.20	0.62
Self-Esteem	52	2.30	5.00	4.01	0.71	121	1.80	5.00	3.87	0.77	181	1.80	5.00	3.91	0.74
Sense of Self	51	1.19	3.56	2.23	0.64	120	1.00	3.87	2.52	0.67	178	1.00	3.87	2.43	0.66
Extraversion	52	1.38	4.88	3.35	0.89	121	1.00	4.75	3.29	0.70	181	1.00	4.88	3.29	0.76
Agreeableness	52	2.11	4.78	3.93	0.52	121	1.44	5.00	3.76	0.72	181	1.44	5.00	3.81	0.66
Conscientiousness	52	2.33	4.78	3.55	0.57	121	1.78	5.00	3.54	0.67	181	1.78	5.00	3.54	0.63
Neuroticism	52	1.00	4.38	2.75	0.79	121	1.00	4.75	2.95	0.71	181	1.00	4.75	2.89	0.73
Openness to Experience	52	2.40	5.00	3.63	0.58	121	1.40	5.00	3.53	0.66	181	1.40	5.00	3.54	0.65
Attitude to Tuition Increase	52	1.00	9.00	5.38	2.69	121	1.00	9.00	1.98	1.70	177	1.00	9.00	3.01	2.56
Pre-Attitude to Tuition Increase	44	1.00	9.00	4.75	2.17	99	1.00	9.00	3.47	2.08	148	1.00	9.00	3.89	2.16
Attitude Change	44	-4.00	4.00	0.75	1.92	98	-8.00	8.00	-1.39	2.72	144	-8.00	8.00	-0.75	2.68
Psychology Discomfort	52	1.00	5.33	2.04	1.35	121	1.00	7.00	2.95	1.60	177	1.00	7.00	2.69	1.60
Personal Trivialization	52	1.00	9.00	6.15	1.68	121	1.00	9.00	5.29	1.88	177	1.00	9.00	5.50	1.90
General Trivialization	52	3.33	9.00	6.54	1.29	121	1.00	9.00	5.20	1.79	177	1.00	9.00	5.57	1.78

Table 3.2 - continued

Diagnostic Exam Issue	High-Choice Condition (Complied)					High-Choice Condition (Not Complied)					Total				
	N	Range		*M*	*SD*	*N*	Range		*M*	*SD*	*N*	Range		*M*	*SD*
		lowest	highest				lowest	highest				lowest	highest		
Narcissism	62	0.00	1.00	0.19	0.17	111	0.00	0.69	0.20	0.15	181	0.00	1.00	0.20	0.16
CSW (Family Support)	61	1.20	6.80	5.13	1.18	110	2.80	7.00	5.29	1.02	179	1.20	7.00	5.24	1.06
CSW (Competition)	61	2.40	7.00	5.03	1.07	110	1.60	7.00	4.89	1.25	179	1.60	7.00	4.97	1.19
CSW (Appearance)	61	3.00	7.00	4.82	0.96	110	2.20	7.00	4.89	1.04	179	2.00	7.00	4.87	1.04
CSW (GOD's Love)	61	1.00	7.00	4.80	1.88	110	1.00	7.00	4.79	1.66	179	1.00	7.00	4.84	1.73
CSW (Academic Competence)	61	2.60	7.00	5.45	1.10	110	2.20	7.00	5.21	1.18	179	2.20	7.00	5.32	1.16
CSW (Virtue)	61	2.40	7.00	5.11	1.12	110	2.20	7.00	5.02	1.16	179	2.20	7.00	5.11	1.15
CSW (Others' Approval)	61	1.00	6.00	3.39	1.12	110	1.00	6.20	3.55	1.20	179	1.00	6.20	3.50	1.19
Contingencies of Self-Worth	61	3.29	6.49	4.82	0.71	110	3.11	6.06	4.81	0.69	179	3.11	6.71	4.83	0.71
Need for Cognition	62	1.33	4.78	3.26	0.68	110	1.33	4.89	3.18	0.58	181	1.33	4.89	3.20	0.62
Self-Esteem	62	2.70	5.00	3.98	0.68	110	1.80	5.00	3.84	0.78	181	1.80	5.00	3.91	0.74
Sense of Self	61	1.19	3.50	2.36	0.60	109	1.00	3.87	2.50	0.69	178	1.00	3.87	2.43	0.66
Extraversion	62	1.38	4.88	3.23	0.87	110	1.00	4.75	3.29	0.70	181	1.00	4.88	3.29	0.76
Agreeableness	62	1.56	4.89	3.85	0.61	110	1.44	5.00	3.77	0.68	181	1.44	5.00	3.81	0.66
Conscientiousness	62	2.33	4.78	3.60	0.56	110	1.78	5.00	3.50	0.67	181	1.78	5.00	3.54	0.63
Neuroticism	62	1.00	4.75	2.78	0.78	110	1.00	4.50	2.98	0.70	181	1.00	4.75	2.89	0.73
Openness to Experience	62	1.40	5.00	3.65	0.67	110	1.70	5.00	3.46	0.64	181	1.40	5.00	3.54	0.65
Attitude to Diagnostic Exam	61	1.00	9.00	5.28	2.76	109	1.00	9.00	2.47	1.97	176	1.00	9.00	3.48	2.63
Pre-Attitude to Diagnostic Exam	51	1.00	9.00	4.51	2.27	91	1.00	8.00	3.59	2.00	148	1.00	9.00	3.92	2.16
Attitude Change	50	-8.00	8.00	0.88	3.31	89	-6.00	4.00	-1.21	2.35	143	-8.00	8.00	-0.47	2.91
Psychology Discomfort	61	1.00	6.00	2.27	1.57	109	1.00	7.00	2.86	1.56	176	1.00	7.00	2.61	1.58
Personal Trivialization	61	1.00	9.00	5.33	2.23	109	1.00	9.00	3.22	2.09	176	1.00	9.00	3.96	2.37
General Trivialization	61	1.00	9.00	5.94	2.12	109	1.00	9.00	3.49	2.12	176	1.00	9.00	4.35	2.42

3.1 Tests of Hypotheses

3.1.1 Hypothesis 1

Hypothesis 1: After controlling for the individual difference variables (i.e. the Big Five variables, need for cognition, self-esteem, narcissism, contingencies of self-worth—academic competence, and strength of sense of self), the condition variable should significantly predict individuals' use of a dissonance-reduction strategy (i.e. showing more positive attitude toward the target proposal). In addition, because 97% of participants in the laboratory sample had provided their pre-attitude regarding the proposed tuition increase, this pre-attitude variable was also controlled in the model.

3.1.1.1 Tests of Hypothesis 1

First, the assumptions of ANCOVA were examined. There was no problem of multicollinearity, heterogeneity of error variance, or heterogeneity of regression slopes. There were no extreme univariate outliers, but one multivariate outlier was detected through Mahalanobis distance, χ^2 (12, N =112) = 38.73, $p < .001$. For this reason, the multivariate analysis used to test Hypothesis 1 was conducted twice: first when the multivariate outlier was included and second when it was excluded.

When the multivariate outlier was retained in the model, only the covariates of pre-attitude and sense of self were significant in the model, F (1, 98) = 56.59, $p < .001$, η_p^2 = 36.6%; F (1, 98) = 4.14, $p = .045$, η_p^2 = 4.1%, respectively. The other covariates were not significant (see Table 3.3 for the values). The independent variable, "condition," was significant, F (2, 98) = 3.20, $p = .045$, η_p^2 = 6.1%. The post hoc test with Bonferroni adjustments revealed that after controlling for participants' personality and pre-attitude toward the proposed tuition increase[6], participants in the high-choice condition who complied to write the counter-attitudinal essay (M = 5.34, SE = .36, 95% CI = [4.62, 6.05]) reported a more positive final attitude then did

[6] Covariates appearing in the model were evaluated at the following values: Tuition = 4.00, NFC = 3.44, SE = 4.03, SOS = 2.49, Extraversion = 3.45, Agreeableness = 3.88, Conscientiousness = 3.71, Neuroticism = 2.80, Openness to Experience = 3.63, NPI = .33, CSW-academic competence = 5.70.

participants in the control condition (*M* = 4.01, *SE* = .36, 95% *CI* = [3.29, 4.73]), *p* = .039. Reported final attitudes in the low-choice condition (*M* = 4.62, *SE* = .37, 95% *CI* = [3.89, 5.36]) were not significantly different from those in the high-choice condition or the control condition.

Table 3.3 ANCOVA Results of Hypothesis 1 with the Multivariate Outlier

Source	*df*	*MS*	*F*	*p*	η_p^2
DV: Attitude					
CVs:					
Pre-Attitude	(1, 98)	256.468	56.588	.000	.366
Need for Cognition	(1, 98)	4.004	.883	.350	.009
Self-Esteem	(1, 98)	2.478	.547	.461	.006
Sense of Self	(1, 98)	18.751	4.137	.045	.041
Extraversion	(1, 98)	.585	.129	.720	.001
Agreeableness	(1, 98)	.024	.005	.942	.000
Conscientiousness	(1, 98)	9.124	2.013	.159	.020
Neuroticism	(1, 98)	.064	.014	.906	.000
Openness	(1, 98)	.617	.136	.713	.001
Narcissism	(1, 98)	4.059	.896	.346	.009
Contingencies of Self-Worth---Academic Competence	(1, 98)	2.718	.600	.441	.006
IV:					
Condition	(2, 98)	14.52	3.20	.045	.061

R^2 = .460 (Adjusted R^2 = .389) , *N* = 112

When the multivariate outlier was excluded from the data, the effect of the previous attitude was still significant, *F* (1, 97) = 58.49, *p* < .001, η_p^2 = 37.6%, but the significant effect of the covariate of sense of self became marginal, *F* (1, 97) = 3.09, *p* = .082, η_p^2 = 3.1%, while the significant main effect of condition became marginally significant, *F* (2, 97) = 2.96, *p* = .057, η_p^2 = 5.7% (see Table 3.4).

Table 3.4 ANCOVA Results of Hypothesis 1 without the Multivariate Outlier

Source	*df*	*MS*	*F*	*p*	η_p^2
DV: Attitude					
CVs:					
Pre-Attitude	(1, 97)	258.421	58.487	.000	.376
Need for Cognition	(1, 97)	3.879	.878	.351	.009
Self-Esteem	(1, 97)	.302	.068	.794	.001
Sense of Self	(1, 97)	13.642	3.087	.082	.031
Extraversion	(1, 97)	1.703	.385	.536	.004
Agreeableness	(1, 97)	.221	.050	.824	.001
Conscientiousness	(1, 97)	15.196	3.439	.067	.034
Neuroticism	(1, 97)	.093	.021	.885	.000
Openness	(1, 97)	.054	.012	.912	.000
Narcissism	(1, 97)	3.947	.893	.347	.009
Contingencies of Self-Worth--Academic Competence	(1, 97)	2.195	.497	.483	.005
IV:					
Condition	(2, 97)	13.06	2.96	.057	.057

R^2 = .470 (Adjusted R^2 = .399) , N = 111

The condition variable had a marginal main effect on the reported attitude toward the proposed tuition increase after controlling for the participants' pre-attitude toward the issue and their personality traits when no data points were excluded; specifically, the high-choice compliance condition had slightly positive attitude toward the event compared to the control condition.

However, because none of the personality measures were found to be significantly correlated with the attitude measure , they were then omitted as covariates from the model and the ANCOVA was conducted again to test whether the variable of condition had main effect on the final attitude over and above the pre-attitude. The assumptions of ANCOVA were met. The results indicated that pre-attitude was still a significant covariate, F (1, 109) = 69.07, p < .001,

η_p^2 = 38.8%, but the condition did not have a significant main effect on the final attitude after controlling for the pre-attitude, F (2, 97) = 2.14, p = .123, η_p^2 = 3.8%.

3.1.1.2 Attitude Change

Although Senn (1998) and Fitzmaurice, Laird and Ware (2004) suggested that pre-test attitude scores should be controlled in randomized experimental studies, as noted above, the pre-attitude and the final attitude ratings regarding the proposed tuition increase issue were not normally distributed. However, the variable of attitude *change* (final attitude minus pre-attitude) *was* normally distributed. For that reason, I tested to see whether using attitude change as the DV would yield similar results.

The assumptions of ANCOVA were examined. There were no extreme univariate outliers, but one multivariate outlier was detected through Mahalanobis distance, χ^2 (11, N =112) = 37.75, p < .001. Multicollinearity was examined by tolerance, VIF, condition indexes, and variance proportions; no problems were detected. Levene's test of equality of error variances indicated the assumption of homogeneity of variance was met. In addition, the homogeneities of regression slopes were tested in the ANCOVA custom model, and there was no significant interaction between IV and each CV.

When the outlier was included in the model, pre-attitude and sense of self were the covariates that were significant, F (1, 98) = 4.40, p = .038, η_p^2 = 4.3%; F (1, 98) = 4.11, p = .045, η_p^2 = 4.0%, respectively (see Table 3.5). The independent variable, condition, was not significant, F (2, 98) = 1.00, p = .370, η_p^2 = 2.0%. When the multivariate outlier was excluded from the data, the covariate of pre-attitude was significant, F (1, 97) = 4.38, p = .039, η_p^2 = 4.3%, but the covariate of strength of sense of self was only marginally significant, F (1, 97) = 3.10, p = .082, η_p^2 = 3.1%. The IV of condition was not significant, F (2, 97) = .89, p = .416, η_p^2 = 1.8% (see Table 3.6).

Table 3.5 ANCOVA Results of Hypothesis 1 (DV: Attitude Change) with the Multivariate Outlier

Source	*df*	*MS*	*F*	*p*	η_p^2
DV: Attitude Change					
CVs:					
Pre-Attitude	(1, 98)	24.157	4.403	.038	.043
Need for Cognition	(1, 98)	2.802	.511	.477	.005
Self-Esteem	(1, 98)	2.734	.498	.482	.005
Sense of Self	(1, 98)	22.564	4.113	.045	.040
Extraversion	(1, 98)	1.636	.298	.586	.003
Agreeableness	(1, 98)	.772	.141	.708	.001
Conscientiousness	(1, 98)	11.692	2.131	.148	.021
Neuroticism	(1, 98)	.309	.056	.813	.001
Openness	(1, 98)	1.099	.200	.655	.002
Narcissism	(1, 98)	2.071	.377	.540	.004
Contingencies of Self-Worth---Academic Competence	(1, 98)	2.715	.495	.483	.005
IV:					
Condition	(2, 98)	5.378	.980	.379	.020

R^2 = .120 (Adjusted R^2 = .004), *N* = 112

Table 3.6 ANCOVA Results of Hypothesis 1 (DV: Attitude Change) without the Multivariate Outlier

Source	*df*	*MS*	*F*	*p*	η_p^2
DV: Attitude Change					
CVs:					
Pre-Attitude	(1, 97)	23.501	4.382	.039	.043
Need for Cognition	(1, 97)	2.691	.502	.480	.005
Self-Esteem	(1, 97)	.349	.065	.799	.001
Sense of Self	(1, 97)	16.604	3.096	.082	.031
Extraversion	(1, 97)	3.408	.636	.427	.007
Agreeableness	(1, 97)	1.463	.273	.603	.003
Conscientiousness	(1, 97)	18.839	3.513	.064	.035
Neuroticism	(1, 97)	.252	.047	.829	.000
Openness	(1, 97)	.212	.040	.843	.000
Narcissism	(1, 97)	1.987	.370	.544	.004
Contingencies of Self-Worth---Academic Competence	(1, 97)	2.164	.404	.527	.004
IV:					
Condition	(2, 97)	4.747	.885	.416	.018

R^2 = .117 (Adjusted R^2 = -.001), *N* = 111

Moreover, after dropping all the personality variables, the results revealed that pre-attitude was only marginally significant, F (1, 109) = 3.78, p = .055, η_p^2 = 3.3%, and the condition did not have main effect on the final attitude either, F (2, 109) = .40, p = .672, η_p^2 = 0.7%.

3.1.1.3 Low-choice versus High-choice Condition

Because it is not common to include the control condition (free-choice condition) in cognitive dissonance research using the counter-attitudinal advocacy paradigm, the following analyses were excluded the control condition and then determined whether there was a difference in the final attitude or in attitude change between the high-choice condition and the low-choice condition.

The results indicated that there was no difference in the final attitude between the high-choice and the low-choice condition when the pre-attitude and the personality variables were controlled, F (1, 62) = 1.93, p = .170, η_p^2 = 3.0%, and only pre-attitude in the model was a significant covariate, F (1, 62) = 22.41, p < .001, η_p^2 = 26.5%. This result remained the same when the one outlier was excluded from the data; CV of pre-attitude, F (1, 61) = 24.58, p < .001, η_p^2 = 28.7%; IV of condition: F (1, 61) = 1.42, p = .238, η_p^2 = 2.3%. In addition, when all the personality variables were dropped from the model, the pre-attitude was still a significant covariate, F (1, 72) = 26.76, p < .001, η_p^2 = 27.1%, and condition was still not a significant IV, F (1, 72) = 1.00, p = .320, η_p^2 = 1.4%.

When the DV was attitude change instead of the final attitude, the results showed that there was no difference in attitude change between the high-choice condition and the low-choice condition after controlling for the pre-attitude and the personality variables, F (1, 62) = .49, p = .488, η_p^2 = 0.8%. The pre-attitude was the only significant covariate in the ANCOVA model, F (1, 62) = 4.20, p = .045, η_p^2 = 6.3%. The same results were found when the outlier was not in the data; CV of pre-attitude, F (1, 61) = 3.49, p = .066, η_p^2 = 5.4%; IV of condition: F (1, 61) = .28, p = .599, η_p^2 = 0.5%. When all the personality variables were dropped from the

model, the condition still had no significant effect on attitude change, F (1, 72) = .12, p = .727, η_p^2 = 0.2%, but pre-attitude was a significant covariate, F (1, 72) = 6.60, p = .012, η_p^2 = 8.4%.

3.1.1.4 Summing-up

In summary, there was only partial support for Hypothesis 1 prediction that the individuals in the high-choice condition who complied by writing the counter-attitudinal essay would be more likely to change their attitude in the positive direction compared to those in the free-choice condition after controlling for their personality traits and pre-attitude, but the attitude change scores were not different among conditions. Moreover, there was no difference in the final attitude or in attitude change between the high-choice condition and the low-choice condition. There was partial evidence for the standard dissonance reduction strategy of changing one's attitude to match one's behavior, after controlling for the participants' personality differences.

3.1.2 Hypothesis 2

Hypothesis 2: Strength of sense of self should predict dissonance-reduction differently for the participants in the various conditions. Specifically, the strength of individuals' sense of self would negatively predict the amount of dissonance-reduction (positive attitude change toward the event) in the high-choice compliance condition (dissonance group), but in the low-choice and free-choice conditions this form of dissonance reduction should not occur, and sense of self should not predict the participants' attitude change in these conditions.

3.1.2.1 Tests of Hypothesis 2

The moderated multiple regressions were applied to examine the relationship between sense of self and attitude in each condition (including free-choice, low-choice, and high-choice compliance) after the participants' pre-attitude was controlled. Following Cohen, Cohen, Aiken and West's (2002) guidelines, the categorical variable, condition, was first re-coded into two unweighted effect codes and the continuous variable, sense of self, was centered before the interaction terms of sense of self X each of the unweighted codes were created.

The Durbin-Watson test showed that the residuals from the regressions were independent; the assumption of constant error variance was met; and no problem of multicollinearity was found in the model. However, there were one distance outlier (studentized deleted residual > 3) and one global influential outlier (Standardizes DFFIT > 1) detected.

When the two outliers were included in the model, the overall model was significant, F (6, 106) = 12.24, $p < .001$, $R^2 = .409$, which indicated that all predictors together could significantly predict participants' final attitude toward the proposed tuition increase, and 40.9% of the variance in the final attitude was accounted for these predictors. In addition, pre-attitude was significant in the model, $b = .81$, t (106) = 8.32, $p < .001$, $sr^2 = 38.6\%$; 38.6% of the variance in final attitude was accounted for by pre-attitude. The main effect of condition was not significant, $\Delta F(2, 106) = .42$, $p = .661$, $\Delta R^2 = 0.5\%$. Sense of self did not significantly predict final attitudes, $b = .43$, t (106) = 1.33, $p = .186$, $sr^2 = 0.9\%$, and neither did the interaction effects, $\Delta F(2, 106) = 0.33$, $p = .723$, $\Delta R^2 = 0.4\%$ (see Table 3.7 for the values of the individual predictors).

Table 3.7 The Overall Regression Model on the Final Attitudes

Variable	*b*	*SE*	*t*	*p*	Sr^2
(Constant)	1.46	0.45	3.26	.002	
Pre-Attitude	0.81	0.10	8.32	.000	38.6%
Centered SOS	0.41	0.33	1.24	.219	0.9%
Unweighted code1	0.09	0.32	0.29	.771	0.0%
Unweighted code2	0.19	0.31	0.60	.552	0.2%
Un1XSOS	0.36	0.46	0.77	.443	0.3%
Un2XSOS	-0.29	0.48	-0.60	.549	0.2%

$N = 113$, $R^2 = .409$, Adj. $R^2 = .376$

Note: Unweighted code1 represents the control condition as the -1, the low-choice condition as 1, and the high-choice compliance condition as 0. Unweighted code1 represents the control condition as the value of -1, the low-choice condition as 0, and high-choice compliance condition as 1.

When the two outliers were excluded from the data, the overall model was significant, F (6, 104) = 15.77, $p < .001$, $R^2 = .476$. The pre-attitude was again a significant predictor in the model, $b = .86$, t (104) = 9.29, $p < .001$, $sr^2 = 43.5\%$. The overall interaction term was still not significant, $\Delta F(2, 104) = 1.61$, $p = .205$, $\Delta R^2 = 1.6\%$, and nor was the main effect of condition, $\Delta F(2, 104) = .46$, $p = .63$., $\Delta R^2 = 0.5\%$; but sense of self was found to be significant in the model when the two outliers were excluded, $b = .65$, t (104) = 2.01, $p = .047$ $sr^2 = 2.0\%$, which revealed that individuals with weak sense of self had more positive final attitudes (see Table 3.8).

Table 3.8 The Overall Regression Model on the Final Attitudes (Excluding Outliers)

Variable	*b*	*SE*	*t*	*p*	sr^2
(Constant)	1.28	0.43	3.01	.003	
Pre-Attitude	0.85	0.09	9.29	.000	43.5%
Centered SOS	0.64	0.32	2.01	.047	2.0%
Unweighted code1	0.10	0.31	0.34	.738	0.1%
Unweighted code2	0.18	0.29	0.60	.550	0.2%
Un1XSOS	0.82	0.46	1.78	.078	1.6%
Un2XSOS	-0.52	0.46	-1.14	.256	0.7%

$N = 111$, $R^2 = .476$, Adj. $R^2 = .446$

In conclusion, the analyses of Hypothesis 2 revealed that, regardless of the inclusion or exclusion of the outliers, the individuals' pre-attitudes significantly predicted their final attitudes (38.6-43.5% of the variance in the final attitude could be explained by the pre-attitude). Sense of self was a significant "main effect" predictor when the outliers were excluded; in this case, individuals with a weak sense of self reported more positive final attitudes than did individuals with a strong sense of self. However, the interaction effect was not significant regardless of whether the outliers were included or excluded. Thus, Hypothesis 2 was not supported. The results showed that individuals' strength of sense of self did not predict their final attitudes differently in the different experimental conditions.

3.1.2.2 Need for Cognition

In a previous study, Cacioppo et al., (1986) found that individuals who had a higher need for cognition were likely to display more attitude-behavior consistency than those who had a lower need for cognition. Based on this finding, the relationship between need for cognition and the participants' final attitude might be different among the conditions. For example, in the high-choice compliance condition, the participants' need for cognition should positively predict their attitude, but this relationship would likely not occur in the other conditions.

To examine this possibility, I conducted the same moderated multiple regression described above, but the personality predictor in this case was need for cognition instead of sense of self.

The assumptions of the regressions were met, and no outlier was detected. Although the overall multiple regression model was significant, F (6, 106) = 12.04, $p < .001$, $R^2 = .405$, only pre-attitude was significant in the model, $b = .81$, t (106) = 8.11, $p < .001$, $sr^2 = 36.9\%$. The main effect of condition was not significant, $\Delta F(2, 106) = .28$, $p = .760$, $\Delta R^2 = 0.3\%$; neither was the predictor of need for cognition, $b = -.03$, t (106) = -.08, $p = .940$, $sr^2 < 0.1\%$; and neither was the effect of their interaction, $\Delta F(2, 106) = .77$, $p = .466$, $\Delta R^2 = 0.9\%$.

The results showed that participants' need for cognition did not predict their subsequent attitude differently among the conditions, and need for cognition was not a significant predictor of final attitude after controlling for the pre-attitude.

3.1.2.3 Self-Esteem

On the other hand, according to research of self-affirmation theory, individuals with high self-esteem should be less likely to use dissonance-reduction strategies compared to individuals with low self-esteem in the cognitive dissonance condition (Tesser & Cornell, 1991; Steele, et al., 1993; Nail et al., 2004). To test this prediction in the current study, additional moderated multiple regressions were conducted on the outcome measure of final attitude, in

which pre-attitude (covariate), centered self-esteem, unweighted effect codes of condition, and the interactions of centered self-esteem and unweighted effect codes were the predictors.

No violations of assumptions were found. No outlier was detected. The overall regression model was significant, F (6, 106) = 12.34, $p < .001$, $R^2 = .411$, indicating 41.1% of the variance in the attitude was accounted for these predictors. Pre-attitude was again a significant predictor, $b = .82$, t (106) = 8.38, $p < .001$, $sr^2 = 39.0\%$, but the main effect of condition, self-esteem, and their overall interaction were all not significant; condition: $\Delta F(2, 106) = .342$, $p = .711$, $\Delta R^2 = 0.4\%$; self-esteem, $b = .17$, t (106) = .52, $p = .602$, $sr^2 = 0.2\%$; interaction, $\Delta F(2, 106) = .91$, $p = .404$, $\Delta R^2 = 1.0\%$.

Thus, self-esteem, in the current sample, did not predict participants' final attitude differently in these conditions, and self-esteem per se was not a significant predictor of final attitude after controlling for the pre-attitude.

3.1.2.4 Summing-up

In summary, only sense of self significantly predicted the final attitude over and above the pre-attitude across the conditions after the two outliers in the data were excluded. This finding indicates that individuals with a weak sense of self would be more likely to report positive attitudes toward the tuition increase issue after controlling for their pre-attitudes, compared to those with a strong sense of self. However, this association of sense of self and attitude did not differ according to which of the experimental conditions the participant was in.

Overall, the test of Hypothesis 2 and the additional analyses revealed that there were no interactions of condition X personality variables. The personality variables of sense of self, need for cognition, and self-esteem did not predict individuals' attitude toward the proposed tuition increase topic *differently* in the control/free-choice, low-choice, and high-choice compliance conditions, after controlling for the participants' pre-attitude.

3.1.3 Hypothesis 3

Hypothesis 3: Individuals in the high-choice compliance condition should report a more positive attitude toward the target proposal than individuals in the low-choice group, and this relationship should be mediated by the degree of reported "psychological discomfort." In addition, sense of self should moderate the relationship between psychological discomfort and reported attitude, such that the psychological discomfort of individuals with a weak sense of self should positively predict their attitude, whereas the psychological discomfort of individuals with a strong sense of self should be a weaker, or even non-significant, predictor of their attitude.

3.1.3.1 Tests of Hypothesis 3

Preacher, Rucker, and Hayes' (2007) SPSS moderated mediation macro was applied to test this hypothesis. The "conditions" in this analysis only included the low-choice condition and the high-choice compliance condition[7], and the psychological discomfort was measured as the average score on three emotion labels—uncomfortable, uneasy, and bothered (Elliot & Devine, 1994). Because the macro does not allow covariates, and because there was no significant difference in pre-attitude in the two conditions, pre-attitude was not included in the model. In the moderated mediation model, the IV condition (low-choice vs. high-choice compliance condition) was expected to predict the DV, final attitude, and this relationship was mediated by psychological discomfort; in addition, whether psychological discomfort could predict attitude change depends on the level of sense of self. The results revealed that there was no significant difference in psychological discomfort between the high-choice compliance condition and the low-choice condition, $b = -0.23$, $t\ (76) = -0.78$, $p = .438$. In addition, the condition did not predict the participants' final attitude when psychological discomfort was partialled out, $b = 0.12$, $t\ (73) = .20$, $p = .844$. However, psychological discomfort did significantly predict the participants' final attitude after controlling for the condition variable, $b = -0.98$, $t\ (73) = -4.18$, $p < .001$. On the

[7] Preacher et al.'s (2007) macro only allows models with continuous and dichromatic variables, but not with categorical variables more than two levels.

other hand, sense of self did not moderate the relationship between psychological discomfort and the final attitude, b = 0.17, t (73) = 0.41, p = .685 (Figure 3.1). The moderated mediation model was not significant at the mean level of sense of self, indirect effect = 0.23, Z = 0.75, p = .456, nor at high or low level of sense of self, indirect effect = 0.25, Z = 0.71, p = .476; indirect effect = 0.20, Z = 0.70, p = .459, respectively. Therefore, the current data did not fit the moderated mediation model, but participants' psychological discomfort was found to negatively relate to their final attitude regardless of their condition (low- or high-choice compliance), which indicated that the less psychological discomfort, the more positive the final attitude reported.

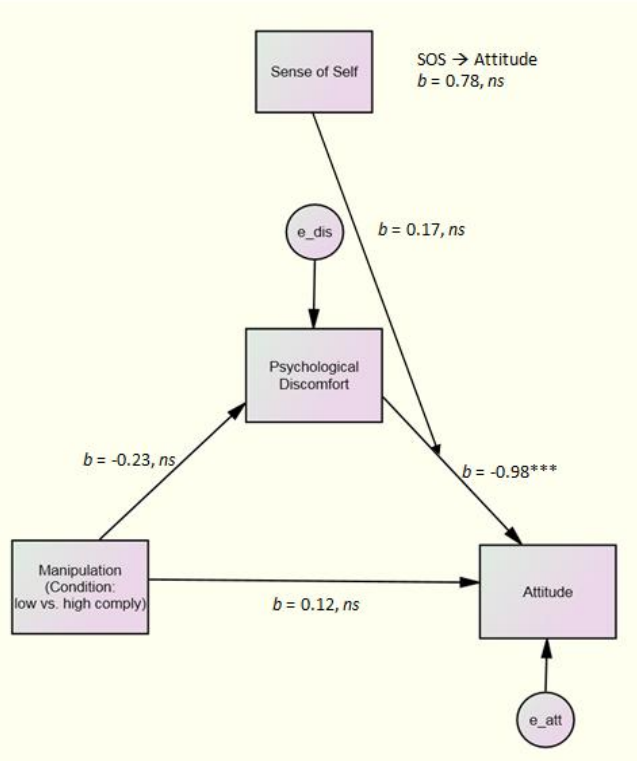


Figure 3.1 Moderated mediation model.
(*** indicates p-level less than .001)

Because the pre-attitude could not be statistically controlled in Preacher et al.'s (2007) macro, I decided to see if the moderated mediation model could be applied to the variable of "attitude change," which focused on the difference between pre-attitude and final attitude. The results showed that the model was still nonsignificant at the mean level of sense of self, indirect effect = 0.11, $Z = 0.53$, $p = .599$, or at the level of high or low sense of self, indirect effect = 0.15, $Z = 0.53$, $p = .596$; indirect effect = 0.06, $Z = 0.38$, $p = .703$, respectively. Psychological discomfort was not a significant mediator and sense of self was not a significant moderator, but psychological discomfort was still a significant predictor of attitude change, such that individuals with less psychological discomfort were more likely to change their attitude than individuals who reported more psychological discomfort, $b = -.67$, t (70) = -2.77, $p = .007$ (Figure 3.2).

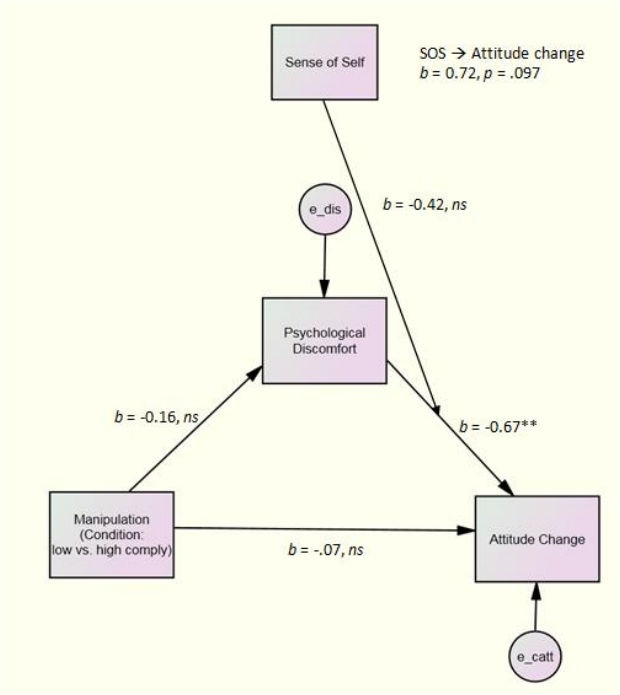


Figure 3.2 Moderated mediation model (attitude change).
(*** indicates p-level less than .001)

3.1.3.2 Summing-up

In summary, Hypothesis 3 was not supported. Psychological discomfort did not mediate the relationship between condition (low-choice vs. high-choice compliance) and final attitude, and sense of self did not moderate the relationship between psychological discomfort and final attitude. However, psychological discomfort per se was a significant predictor of attitude. Individuals who reported more psychological discomfort actually had relatively negative attitudes toward the target proposal compared to those who reported less psychological discomfort. The same results were found when the DV was attitude change instead of final attitude. The moderated mediation model was not significant for the DV of attitude change, but psychological discomfort was negatively associated with attitude change—less discomfort, more attitude change.

3.1.4 Hypothesis 4

Hypothesis 4: In the high-choice condition, when the importance of the event was rated *before* the attitude report, individuals with a weak sense of self should apply the strategy of trivialization to reduce dissonance and then report a less positive attitude toward the target proposal later; however, if the importance question was asked *after* the final rating of the attitude, the strategy of attitude change would be used but trivialization would not. With regard to individuals differences, individuals with strong sense of self should be less likely to trivialize the event and also less likely to use the dissonance-reduction strategy of attitude change (less likely to report positive attitude), regardless of the order of the questions.

This hypothesis was tested in two moderated multiple regression models in which the participants' pre-attitude, sense of self, the order of attitude and trivialization (unweighted effect code of high-choice attitude/trivialization compliance condition vs. high-choice trivialization/attitude compliance condition), and the interaction of sense of self X the order were included to predict the participants' final attitude toward the proposed tuition increase, and also to predict the perceived importance of the event.

3.1.4.1 Measure of Attitude

The first model was used to test whether the final attitude differed between the high-choice attitude/trivialization compliance condition and the high-choice trivialization/attitude compliance condition. Predictors included the pre-attitude toward the tuition increase, centered sense of self, the unweighted effect code of the order (attitude/trivialization condition was coded as 1, and trivialization/attitude condition was coded as -1), and the interaction of centered sense of self and unweighted effect code of the order. The DV was the final attitude toward the tuition increase.

The Durbin-Watson test showed that the residuals from the regressions were independent; the assumption of constant error variance was met; and no problem of multicollinearity was found. However, one outlier was detected.

When the outlier was included in the model, the overall model was significant, F (4, 72) = 11.62, $p < .001$, $R^2 = .392$, but the only significant predictor was the pre-attitude toward the proposed tuition increase, $b = .75$, t (72) = 6.79, $p < .001$, $sr^2 = 38.7\%$, which indicates that if the participants already had a more positive attitude toward the issue before participating in the study, they were more likely to report a relatively positive attitude in the end of the study. No other significant predictor was found. There was no difference of the "order" variable on the final attitude, $b = -.04$, t (72) = -.17, $p = .865$, $sr^2 < 0.1\%$, revealing that whether the attitude measure was asked before or after trivialization measure did not affect the final attitude reported. In addition, sense of self did not predict the participants' final attitude, $b = -.04$, t (72) = .10, $p = .923$, $sr^2 < 0.1\%$; and neither did the interaction of sense of self X the order variable, $b = .08$, t (72) = .21, $p = .837$, $sr^2 < 0.1\%$.

The results remained the same when the outlier was excluded from the data. The overall model was still significant, F (4, 71) = 14.25, $p < .001$, $R^2 = .445$. The only significant predictor was the pre-attitude, $b = .80$, t (71) = 7.52, $p < .001$, $sr^2 = 44.1\%$. The predictors of sense of self, order of attitude and trivialization, and their interaction were all nonsignificant, $b =$

-.17, t (71) = -.44, p = .658, sr^2 = 0.2%; b = -.11, t (71) = -.47, p = .637, sr^2 = 0.2%; b = -.14, t (71) = -.37, p = .711, sr^2 = 0.1%, respectively.

3.1.4.2 Measure of Importance (Trivialization)

The second model tested whether the perceived importance of the proposed tuition increase differed between the two conditions (high-choice attitude/trivialization compliance and high-choice trivialization/attitude compliance). In the second model, participants' pre-attitude was included as the covariate. Centered sense of self, the unweighted effect code of order, and the interaction of sense of self and order were also used in the model to predict the perceived importance of the proposed tuition increase.

The Durbin-Watson test showed that the residuals from the regressions were independent; the assumption of constant error variance was met; there was no problem of multicollinearity; and no outlier was found. The overall model was significant, F (4, 72) = 3.59, p = .010, R^2 = .116. Although sense of self and the interaction of sense of self and order were both nonsignificant, b = -.18, t (72) = -.36, p = .722, sr^2 = 0.1%; b = -.39, t (72) = -.78, p = .440, sr^2 = 0.7%, pre-attitude was a significant predictor, b = .42, t (72) = 2.97, p = .004, sr^2 = 10.2%. Not surprisingly, finding indicates that participants who reported more positive pre-attitude toward the tuition increase issue were also more likely to report a higher importance value of the issue. Moreover, the predictor of order was also significant in the model, b = -.66, t (72) = -2.09, p = .040, sr^2 = 5.1%, revealing that when the importance of the proposed tuition increase was rated before the attitude measure, participants perceived the target proposal as was *more* important than when the importance was asked after the attitude measure.

3.1.4.3 Summing-up

Hypothesis 4 was not supported. In contrast to the predicted trivialization effect, the participants rated the target proposal as more, rather than less, important when the importance measure was taken before the final attitude measure; and this finding did not depend on the strength of the participants' sense of self.

3.1.5 Hypothesis 5

Hypothesis 5: In the online survey study in which participants received no direct social pressure to agree to write counter-attitudinal essays, those who were more open to experience should be more likely to agree to write a counter-attitudinal essay regardless of the topic, whereas those who were more closed to experience should be more likely to *disagree* to write the counter-attitudinal essay, regardless of the topic (tuition increase or diagnostic exam).

In the online sample, 84 participants complied with the written request to write the counter-attitudinal essays for both topics; 31 participants declined to write the counter-attitudinal essay for the proposed tuition increase issue but agreed to write one for the proposed diagnostic exam; 21 participants, on the other hand, agreed to write the counter-attitudinal essay for the topic of diagnostic exam but not for the topic of tuition increase; and 30 participants decline to write the counter-attitudinal essays for both topics[8]. Before I conducted the test of Hypothesis 5, I applied the McNemar test to determine whether one of the two topics had a higher compliance rate than the other. The result revealed no significant preference of agreeing to write a counter-attitudinal essay based on its topic, $p = .212$.

Next, point-biserial correlations were calculated between openness to experience and the participant's dichotomous decision to agree/disagree to write the counter-attitudinal essay for each of the two different topics (tuition increase and diagnostic exam; agree to write the counter-attitudinal essay was coded as 1, disagree was coded as -1). The correlation was not significant between openness to experience and the individual's decision to agree/disagree to write the counter-attitudinal essay for the topic of proposed tuition increase, $r = .07$, $p = .350$. However, the correlation was marginally significant between openness to experience and the decision to agree/disagree to write the counter-attitudinal essay for the topic of proposed diagnostic exam issue, $r = .14$, $p = .070$. The Steiger's t was not significant, t (163) = .73, p

[8] The participants who declined to write the counter-attitudinal essay wrote essays that expressed their own opinions instead. Participants who did not provide any essays were excluded from these analyses.

= .465, which means the two correlation values were not significantly different from each other in a dependent correlation design.

Thus, Hypothesis 5 was only partially supported. The correlation measures revealed that participants' openness to experience was only marginally related to their decision to agree or disagree to write the counter-attitudinal essays for the topic of the proposed diagnostic exam; if the participants were more open to experience, they were more likely to agree to write the counter-attitudinal essay of the topic of the proposed diagnostic exam. This marginal effect also replicated the original finding obtained in my online pilot study, in which the participants were also asked to write the essays to support a proposed diagnostic exam implemented by the Department of Psychology at UTA, $r = .22$, $p = .025$. On the other hand, the correlation between openness to experience and the decision for the topic of tuition increase was not significant, and the relationship between openness and decision was not significantly different between the two different topics (diagnostic exam and tuition increase).

3.2 Content Analyses of the Essays: LIWC Data Analyses

Previous studies of cognitive dissonance in the counter-attitudinal advocacy paradigm have focused on the dissonance-reduction strategies that participants use (i.e., attitude change, trivialization) after writing the counter-attitudinal essay. However, if some dissonance occurs prospectively, when individuals first agree to write the counter-attitudinal essay, could that dissonance be expressed and found in that participants' written words? Some research has found that individuals use different linguistic content categories as a function of their current mental state (Campbell, 2003; Ickes & Cheng, 2010; Kahn, Tobin, Massey, & Anderson, 2007; Pennebaker & Chung, 2007; Pennebaker & Stone, 2004). Thus, in the present study, I would also like to see whether the participants' linguistic contents differ among my experimental conditions in ways that express their different psychological states.

To identify these content differences, the Linguistic Inquiry and Word Count (LIWC) software program developed by Pennebaker, Booth, and Francis (2007) was used to analyze

the linguistic content used in the participants' essays. Because the LIWC analysis categorizes each individual participant's words used into 80 different content-based measures and then calculates the percentages of words used in each category, it offers a good way to identify the types of content that participants report in different experimental conditions. The 80 LIWC2007 measures include standard linguistic categories (pronouns, negations, assents, articles, prepositions, and number), psychological processes (words about affective or emotional processes, cognitive processes, sensory and perceptual processes, and social processes), relativity (words about time, space, and motion), personal concerns (words about occupation, leisure activity, money and financial issues, meta-physical issues, physical states, and functions), and certain experimental dimensions developed for use in previous research (swear words, nonfluencies, etc., see Table 3.9). However, some of the LIWC categories were not used in the current analyses because their average reported percentages were less than 0.5%, a "floor effect" that may causes bias in the data analyses and their interpretations. Therefore, I decided to include only the 48 of the 80 LIWC categories that had a reported usage rate higher than 0.5%.

Table 3.9 The Abbreviation and Examples of
Each LIWC Category Adopted from LIWC2007 Manual

Category	Abbrev	Examples
Linguistic Processes		
Word count	wc	
words/sentence	wps	
Dictionary words	dic	
Words>6 letters	sixltr	
Total function words	funct	
Total pronouns	pronoun	I, them, itself
Personal pronouns	ppron	I, them, her
1st pers singular	i	I, me, mine
1st pers plural	we	We, us, our
2nd person	you	You, your, thou
3rd pers singular	shehe	She, her, him
3rd pers plural	they	They, their, they'd
Impersonal pronouns	ipron	It, it's, those

Table 3.9 - continued

Category	Abbrev	Examples
Articles	article	A, an, the
Common verbs	verb	Walk, went, see
Auxiliary verbs	auxverb	Am, will, have
Past tense	past	Went, ran, had
Present tense	present	Is, does, hear
Future tense	future	Will, gonna
Adverbs	adverb	Very, really, quickly
Prepositions	prep	To, with, above
Conjunctions	conj	And, but, whereas
Negations	negate	No, not, never
Quantifiers	quant	Few, many, much
Numbers	number	Second, thousand
Swear words	swear	Damn, piss, fuck
Psychological Processes		
Social processes	social	Mate, talk, they, child
Family	family	Daughter, husband, aunt
Friends	friend	Buddy, friend, neighbor
Humans	human	Adult, baby, boy
Affective processes	affect	Happy, cried, abandon
Positive emotion	posemo	Love, nice, sweet
Negative emotion	negemo	Hurt, ugly, nasty
Anxiety	anx	Worried, fearful, nervous
Anger	anger	Hate, kill, annoyed
Sadness	sad	Crying, grief, sad
Cognitive processes	cogmech	cause, know, ought
Insight	insight	think, know, consider
Causation	cause	because, effect, hence
Discrepancy	discrep	should, would, could
Tentative	tentat	maybe, perhaps, guess
Certainty	certain	always, never
Inhibition	inhib	block, constrain, stop
Inclusive	incl	And, with, include
Exclusive	excl	But, without, exclude
Perceptual processes	percept	Observing, heard, feeling
See	see	View, saw, seen
Hear	hear	Listen, hearing
Feel	feel	Feels, touch
Biological processes	bio	Eat, blood, pain
Body	body	Cheek, hands, spit
Health	health	Clinic, flu, pill
Sexual	sexual	Horny, love, incest
Ingestion	ingest	Dish, eat, pizza
Relativity	relativ	Area, bend, exit, stop
Motion	motion	Arrive, car, go

Table 3.9 - continued

Category	Abbrev	Examples
Space	space	Down, in, thin
Time	time	End, until, season
Personal Concerns		
Work	work	Job, majors, xerox
Achievement	achieve	Earn, hero, win
Leisure	leisure	Cook, chat, movie
Home	home	Apartment, kitchen, family
Money	money	Audit, cash, owe
Religion	relig	Altar, church, mosque
Death	death	Bury, coffin, kill
Spoken categories		
Assent	assent	Agree, OK, yes
Nonfluencies	nonflu	Er, hm, umm
Fillers	filler	Blah, Imean, youknow

3.2.1 Content Differences among the Condition in the Laboratory Study

To determine whether participants reported different types of linguistic content in the different conditions (control condition, low-choice condition, and high-choice compliance condition) of the laboratory sample, a series of one-way ANCOVAs were conducted. The purpose of these analyses was to see whether the percentage of the 48 LIWC categories differed among the conditions after the participants' pre-attitude toward the proposed tuition increase was controlled. Because there were 48 analyses performed, the significance levels were adjusted to .01 for each test in order to correct the inflated type I error.

The ANCOVA results are reported in Table 3.10. Of the 48 LIWC measures analyzed, significant differences among the conditions were found for four of them ($p < .01$). The four significant LIWC variables were words of present tense, words related to money, words longer than six letters, and words of positive emotion (see Tables 3.10 and 3.11). The means and standards error of these variables are presented in Table 3.11. Participants in the high-choice compliance condition were more likely to use words longer than six letters and words expressing positive emotion/optimization compared to participants in the control condition. On the other hand, participants in the high-choice compliance condition were less likely to use

present tense words in their arguments than those in the control and low-choice conditions. Finally, participants in the low-choice condition and in the high-choice compliance condition were less likely to use money words than participants in the control condition.

Table 3.10 ANCOVA Results of 48 LIWC Variables

	IV: Group *dfs* (2, 147)			CV: Pre Attitude *dfs* (1, 147)		
DV	*F*	*p*	ηp2	*F*	*p*	ηp2
WC	2.034	.134	.027	.399	.529	.003
WPS	1.562	.213	.021	.236	.628	.002
Sixltr	**8.154**	**.000**	**.100**	.672	.414	.005
Dic	1.628	.200	.022	.248	.619	.002
funct	3.893	.023	.050	.774	.380	.005
pronoun	1.964	.144	.026	.290	.591	.002
ppron	1.670	.192	.022	.799	.373	.005
i	2.591	.078	.034	.161	.689	.001
we	.236	.790	.003	.155	.694	.001
they	.096	.909	.001	1.115	.293	.008
ipron	1.004	.369	.013	.031	.861	.000
article	1.786	.171	.024	1.000	.319	.007
verb	2.464	.089	.032	.145	.703	.001
auxverb	.547	.580	.007	.606	.437	.004
past	3.093	.048	.040	.475	.492	.003
present	**11.124**	**.000**	**.131**	.468	.495	.003
future	2.113	.125	.028	.633	.428	.004
adverb	.735	.481	.010	.490	.485	.003
preps	.006	.994	.000	.364	.547	.002
conj	1.318	.271	.018	2.146	.145	.014
negate	4.239	.016	.055	.954	.330	.006
quant	1.175	.312	.016	.304	.582	.002
number	.003	.997	.000	.777	.380	.005
social	.464	.630	.006	.035	.851	.000
affect	4.413	.014	.057	1.237	.268	.008
posemo	**6.265**	**.002**	**.079**	1.127	.290	.008
negemo	1.926	.149	.026	.108	.743	.001
cogmech	.747	.475	.010	.414	.521	.003
insight	1.499	.227	.020	.060	.807	.000
cause	.952	.388	.013	.772	.381	.005
discrep	2.153	.120	.028	.095	.759	.001
tentat	2.147	.120	.028	.116	.734	.001
certain	.122	.886	.002	.664	.417	.004
incl	.186	.830	.003	.129	.720	.001
excl	3.361	.037	.044	.979	.324	.007
percept	3.076	.049	.040	.546	.461	.004
relativ	1.167	.314	.016	.320	.572	.002
motion	1.188	.308	.016	2.290	.132	.015

Table 3.10 - continued

	IV: Group *dfs* (2, 147)			CV: Pre Attitude *dfs* (1, 147)		
DV	*F*	*p*	ηp2	*F*	*p*	ηp2
space	.411	.664	.006	.045	.832	.000
time	3.554	.031	.046	1.170	.281	.008
work	2.519	.084	.033	.013	.908	.000
achieve	1.818	.166	.024	2.165	.143	.015
leisure	.410	.664	.006	.195	.659	.001
money	**5.283**	**.006**	**.067**	**7.020**	**.009**	**.046**
Period	1.003	.369	.013	.004	.952	.000
Comma	.077	.926	.001	.181	.671	.001
Apostro	4.374	.014	.056	.829	.364	.006
AllPct	1.117	.330	.015	.000	.994	.000

Bold indicates the variable was significant at p-level of .01.

Table 3.11 Post Hoc Tests of ANCOVAs on the Significant LIWC Variables

				Condition							
	IV effect after controlling for CV (pre-attitude)			Control			Low-Choice			High-Choice (Compliance)	
DV	*F* (2, 147)	*p*	η_p^2	*M*	*SE*		*M*	*SE*		*M*	*SE*
present	11.12	.000	0.13	9.40	.42	*b*	8.61	.43	*b*	7.12	.29
money	5.28	.006	0.07	4.42	.29	*ab*	3.15	.29		3.57	.20
Sixltr	8.15	.000	0.10	21.01	.78	*b*	22.72	.80		24.77	.55
posemo	6.27	.002	0.08	3.15	.29	*b*	4.02	.30		4.40	.21

N = 151
All the mean values at the mean level of pre-attitude (*M* = 4.08) toward the proposed tuition increase issue.

a indicates the group differed from low-choice group.
b indicates the group differed from high-choice complied group.

In summary, the results of the laboratory study revealed that participants in the different experimental conditions used certain types of words differently after controlling for their pre-attitude toward the proposed tuition increase. Compared to those in the control condition, individuals in the high-choice compliance condition were more likely to use words expressing positive emotion (e.g., nice, sweet, like) and words longer than six letters in their arguments. One possible reason is that because they chose to support the tuition increase issue "freely,"

they would want to express more positive emotion to emphasize the positive side of the target proposal and to persuade others as well as themselves. They may have wanted to use more "big words" (words longer than six letters) to enhance the strength of the arguments.

In contrast, individuals in the high-choice compliance condition were less likely to use present tense words (e.g., is, does, hear) in their arguments compared to those in the control and the low-choice conditions. This could be because they focused on how the proposed tuition increase could address past problems and result in future benefits, instead of focusing on the present costs of the proposal.

Finally, individuals in the low-choice condition and high-choice compliance condition were less likely to use money words (e.g., owe, pay) than those in the control condition. One possible explanation was that because they had to write essays in support of the tuition increase issue, they tried to downplay the costs of the proposal by avoiding mentioning money words.

3.2.2 Content Differences between the Online Study and the Laboratory Study

When conducting the studies, I noticed that the participants in the online sample generally wrote shorter essays compared to those in the laboratory sample, although the instructions of the two studies were exact the same—asking for essays about 200-300 words long. In addition, as noted before, there was a big difference in the compliance rate (probability of agreeing to write the counter-attitudinal essay for the proposed tuition increase) between the online and the laboratory studies. I therefore tested to see if LIWC variable usage was different between types of study (the online vs. the laboratory studies) and the decision of compliance (agree vs. disagree to write the counter-attitudinal essay for the topic of proposed tuition increase).

I first conducted preliminary analyses to see whether there were differences in the participants' personality traits between the online and laboratory samples. Interestingly, I found that although the online and laboratory studies had a similar title and content, participants who

chose to participate in the online study had statistically lower contingencies of self-worth, t (321) = -2.91, p = .004, need for cognition, t (323) = -3.84, p < .001, conscientiousness, t (321) = -2.25, p = .025, and narcissism personality trait, t (323) = -6.98, p < .001, compared to participants in the laboratory sample. Therefore, these four personality variables as well as the participants' pre-attitude toward the tuition increase were controlled in the ANCOVA models of the 48 LIWC variables, where the IVs were the study type (online vs. laboratory) and the decision of agreeing or disagreeing to write the counter-attitudinal essay. The significance levels were again set at .01.

No significant interaction between type of study (online vs. laboratory) and type of comply (agree or disagree to write the counter-attitudinal essay) was found. However, the main effect of study type (online vs. laboratory) was significant for three of the 48 LIWC DVs—number of words, F (1, 204) = 21.62, p < .001, η_p^2 = .10, words longer than six letters, F (1, 204) = 13.47, p < .001, η_p^2 = .06, and article words, F (1, 204) = 7.70, p = .006, η_p^2 = .04. The results indicated that after controlling for participants' pre-attitude, need for cognition, conscientiousness, contingencies of self-worth, and narcissism, the participants in the lab study tended to write more words (M = 220.01, SE = 14.31, 95%CI = [191.96, 248.06]) than did those in the online study (M = 142.93, SE = 7.54, 95%CI = [128.15, 157.71]). Participants in the laboratory sample also used more words longer than six letters (M = 25.69, SE = 1.03, 95%CI = [23.67, 27.71]) and more article words (M = 8.83, SE = .49, 95%CI = [7.87, 9.79]), compared to participants in the online sample (words longer than six letters: M = 21.32, SE = .54, 95%CI = [20.26, 23.38]; article words: M = 7.27, SE = .26, 95%CI = [6.76, 7.78]). One possible reason was that, because of the presence of the experimenter as an authority figure, individuals who participated in the laboratory study might have taken the study more seriously and were more likely to follow the instructions to provide 200 to 300 words long essays, and use more big words (words with 7 or more letters) as well as more articles.

On the other hand, the main effect of compliance type (agreeing vs. disagreeing to write the counter-attitudinal essay) was significant for four of the 48 LIWC variables—negation words, F (1, 204) = 8.39, p = .004, η_p^2 = .04, words of positive emotion, F (1, 204) = 11.27, p = .001, η_p^2 = .05, words of negative emotion, F (1, 204) = 15.53, p < .001, η_p^2 = .07, and words relevant to money, F (1, 204) = 10.84, p = .001, η_p^2 = .05. After controlling for the pre-attitude toward the proposed tuition increase, and the personality measures of need for cognition, conscientiousness, contingencies of self-worth, and narcissism, the participants in the high-choice compliance condition were more likely to use positive emotion words (e.g., nice, sweet, like) than those in the high-choice non-compliance condition; whereas the individuals in the non-compliance condition were more likely to use words of negation (e.g., no, not, never), negative emotion words (e.g., fear, hate, pain), and words related to money (e.g., owe, pay, bill; see Table 3.12 for the means and *SE*s) than those in the compliance condition. On possible explanation is that because participants who wrote the essays against the tuition increase proposal were more likely to focus on the negative parts of the tuition increase, they were more likely to use words related to money, words of negations, and words of negative emotion; in contrast, the participants who agreed to write the counter-attitudinal essay used more positive emotion words to persuade others and themselves.

Table 3.12 Means and SEs of Significant Different Variables

Dependent Variable	Compliance Type	Mean	*SE*	95% Confidence Interval	
				Lower Bound	Upper Bound
negate	Compliance	1.150 [a]	.155	.845	1.455
	Non-Compliance	2.098 [a]	.284	1.538	2.657
posemo	Compliance	4.739 [a]	.240	4.266	5.213
	Non-Compliance	3.034 [a]	.441	2.164	3.903
negemo	Compliance	.622 [a]	.106	.413	.830
	Non-Compliance	1.504 [a]	.194	1.121	1.886
money	Compliance	3.842 [a]	.231	3.386	4.299
	Non-Compliance	5.454 [a]	.425	4.616	6.291

[a]. Covariates appearing in the model are evaluated at the following values: pre-attitude = 4.04, NFC = 3.31, NPI = .23, CSW = 4.94, Cons = 3.61.

3.1.6.3 Summing-up

There was evidence of significant differences in the linguistic content of the essays written in the online versus laboratory study. Specifically, the results of the comparison between online and laboratory studies implied that participants in the laboratory study might have taken the study more seriously (using more words, more words longer than six letters, and more articles). Additionally, the participants in the compliance condition wrote essays that contained a greater percentage of words of positive emotion, but a smaller percentage of words of negative emotion, negation, and money-related than those in the non-compliance condition in both the online the and laboratory samples.

CHAPTER 4

DISCUSSION

The purpose of the current was to investigate whether personality variables moderated dissonance reduction behavior in a counter-attitudinal advocacy paradigm. The specific findings were provided below.

4.1 Tests of the Research Hypothesis

4.1.1 Findings relevant to Hypothesis 1

Hypothesis 1 predicted a replication of the standard cognitive dissonance effect in the counter-attitudinal advocacy paradigm, and was supported. Overall, the results revealed that the dissonance-reducing strategy of changing one's attitude following counter-attitudinal advocacy was applied by the participants in the high-choice compliance condition. The participants in this condition reported more positive attitude change (marginally) than those in the control condition, after controlling for the pre-attitude and their personality traits. The participants in the high-choice compliance condition also displayed more positive attitude changes compared to those in the control (free-choice) condition, when the personality variables were controlled. The results replicate the findings of previous research (e.g., Miller, Wozniak, Rust, Miller, & Slezak, 2002), in which writing counter-attitudinal essays under a condition of high perceived choice predicted more positive attitude outcomes.

On the other hand, the participants who were forced to write the counter-attitudinal essay in the low-choice condition did not report relatively negative attitudes toward the proposed tuition increase compared to those in the high-choice compliance condition. This was different from some previous research in which individuals in the low-choice condition were found to have relatively negative attitudes when compared to individuals in the high-choice compliance condition (e.g., Cooper, Zanna, & Taves, 1978; Simon, Greenberg, & Brehm, 1995;

Stalder & Baron, 1998). In contrast, it was found that these participants in the low-choice condition actually had a more positive final attitude than their pre-attitude, but their final attitudes did not differ from the final attitudes reported in the other conditions (see Figure 4.1[9]). This outcome implies that the participants in the low-control condition might have experienced at least some cognitive dissonance (i.e., more than that of the participants in the control condition but less than that of the participants in the high-choice compliance condition).

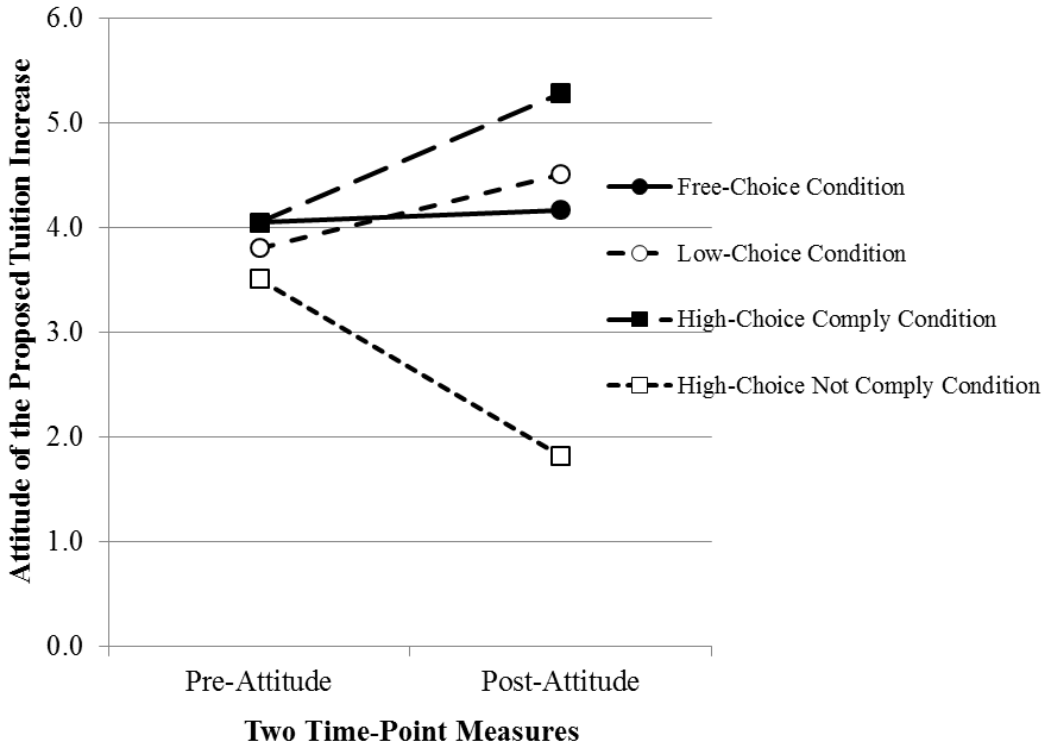


Figure 4.1 Pre-attitude and final attitude of each.

[9] The simple effect analyses of the repeated-measure ANCOVA revealed that, after controlling for their personality, the participants in the high-choice compliance condition tended to report a more positive final attitude than their pre-attitude (p = .001), and the participants in the low-choice condition reported a marginally more positive final attitude rather than their pre-attitude (p = .069); whereas those in the high-choice non-compliance condition displayed a relatively more negative final attitude than their pre-attitude (p = .078).

This pattern of means could be explained by Baumeister and Tice's (1984) finding that either perceived control (high- or low- choice) or self-presentation (public or private/anonymous) could evoke cognitive dissonance phenomena. In the current study, participants were asked to provide their name after writing the essay, which could be considered as a form of public presentation. Therefore, although the participants in the low-choice condition did not have the perception of freedom to choose to write the counter-attitudinal essay, their awareness of a public self-presentation might have resulted in a moderate amount of cognitive dissonance.

In conclusion, the findings relevant to Hypothesis 1 revealed that after controlling for the pre-attitude and the personality variables, the participants in the high-choice compliance condition were more likely to adopt the dissonance-reduction strategy by reporting a more positive final attitude, whereas the participants in the low-choice condition might have experienced a smaller (moderate) amount of dissonance because of their awareness of public self-presentation (reporting their name). However, the dissonance effect was not detected if the personality variables were excluded from the model.

4.1.2 Findings relevant to Hypothesis 2

Hypothesis 2 predicted that the relationship between the strength of sense of self and the use of the typical dissonance-reduction strategy (i.e., an increased positive attitude toward the target proposal), should be different for participants in the various conditions after their pre-attitude was controlled. Specifically, the strength of individuals' sense of self should negatively predict the amount of dissonance-reduction used in the high-choice compliance condition, but not in the low-choice and free-choice conditions.

This hypothesis was not supported in the current study. Although the participants' pre-attitude positively predicted their final attitude, there was no significant interaction between sense of self and condition when the pre-attitude was controlled. Instead, the participants' strength of sense of self had a *main effect* influence on final attitudes: it negatively predicted the participants' final attitude over and above their pre-attitude across all conditions when the

outliers were excluded from the analyses. That is, those individuals with strong sense of self were less likely to report a positive attitude toward the proposed tuition increase, whereas those with weak sense of self were more likely to report a positive attitude, regardless of this condition they were in.

Why did strength of sense of self negatively predict attitude across the experimental conditions? According to the theoretical conception proposed by Flury and Ickes (2007), individuals with a weak sense of self are uncertain about their opinions, which tend to be unstable and only weakly held, whereas individuals with a strong sense of self have opinions that are strong, definite, and well-defined. If so, the act of writing a counter-attitudinal essay might have temporarily influenced the opinions of participants with a weak sense of self more than those of participants with a strong sense of self, regardless of the condition they were in.

Previous research has also found that certain personality traits are related to a general susceptibility to persuasion. Janis (1954) found that individuals with low self-esteem were more readily influenced, whereas individuals with high level of neurotic anxiety were more resistant; and Chen and Lee (2008) demonstrated that individuals with high levels of agreeableness and conscientiousness were more influenced by central-route persuasive messages, whereas those with high levels of emotional stability, openness to experience, and extraversion were more influenced by peripheral-route persuasive messages when shopping online. In addition, Haddock, Maio, Arnold, and Huskinson (2008) reported that individuals with a high need for affect reported more positive attitudes toward affective messages, whereas individuals with high need for cognition reported more positive attitudes toward cognitive messages. It may be possible that sense of self is one of the personality variables that is related to a general "influenceability" in which cognitive dissonance plays little or no role.

4.1.3 Findings relevant to Hypothesis 3

It was hypothesized that individuals in the high-choice compliance condition should have a more positive attitude (dissonance-reduction used) than individuals in the low-choice

group, and that this relationship should be mediated by the degree of reported "psychological discomfort." The high-choice compliance condition should elicit more psychological discomfort, and this discomfort should predict a more positive final attitude. In addition, sense of self should moderate the relationship between psychological discomfort and reported attitude, such that the psychological discomfort of individuals with a weak sense of self should positively predict their attitude, whereas the psychological discomfort of individuals with strong sense of sense should be a weaker, or even non-significant, predictor of their attitude.

The findings did not support the hypothesis. First, psychological discomfort did not mediate the relationship between condition and attitude or attitude change. It was found that psychological discomfort was not significantly different across the experimental conditions. Second, although psychological discomfort was found to *negatively* predict attitude and attitude change, this negative relationship was not qualified by the participants' strength of sense of self and condition.

Why did psychological discomfort not mediate the relationship between condition and attitude/attitude change as hypothesized? A possible empirical reason suggested by the data was the problem of restriction of the range. The means of reported psychological discomfort in the experimental conditions ranged from 1.68 (*SD* = 1.08) to 3.05 (*SD* = 1.38) in a 7-point Likert scale. A "floor effect" of psychological discomfort therefore seemed to exist[10], which might explain the difficulty of detecting the differences of psychological discomfort among the experimental conditions. However, because psychological discomfort still had a significant negative effect on attitude change across all conditions[11], I was led to wonder whether the psychological discomfort here was *not* evoked by the condition manipulation but by certain individual difference variables instead.

[10] The variable of discomfort was also reversed and log transformed, but both transformations on the variable did not help the normality much. Using the transformed variables, the results of the analyses still retained the same. In addition, even if the variable of discomfort was recorded into dichotomic (value higher than the mean vs. value lower than the mean), the results did not change.

[11] This negative relation retained even if the psychological discomfort was reversed/log transformed or dichotomic.

The correlations between psychological discomfort and the personality variables are reported in Table 3.13. Note that the degree of psychological discomfort reported in this counter-attitudinal advocacy situation was significantly correlated with several personality measures: self-esteem, sense of self, extraversion, agreeableness, conscientiousness, neuroticism, and openness to experience. Individuals with low self-esteem, weak sense of self, low extraversion, low agreeableness, low conscientiousness, low openness, but high neuroticism were more likely to report a relatively high level of psychological discomfort. Thus, the negative correlation between psychological discomfort and final attitude/attitude change might represent the relations between the attitude and certain personality traits, and have little or nothing to do with the motivational drive state of cognitive dissonance.

Table 4.1 Correlations between Variables

		2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	Psychological Discomfort	-.299**	-.155	-.197*	-.109	-.229**	-.096	-.006	-.073	-.197*	.222**	-.192*	-.276**	-.214**	.268**	-.151[a]
2	Attitude	---	.616**	.658**	.390**	.473**	.060	-.004	.136	.049	.059	.117	.105	.103	-.109	.150
3	Pre-Attitude		---	-.187*	.301**	.412**	-.027	-.033	.131	.028	-.010	.100	.167*	.112	-.160*	.116
4	Attitude Change			---	.186*	.199*	.097	.007	.051	.018	.073	.044	-.051	.031	.018	.078
5	Self-Trivialization				---	.799**	-.008	-.025	.108	.082	-.001	.041	.115	.166*	-.138	.129
6	General-Trivialization					---	-.027	-.025	.093	-.013	.066	.038	.029	.131	-.062	.121
7	NPI						---	.096	.186*	.293**	-.038	.395**	-.074	.217**	-.032	.210**
8	CSW							---	-.024	-.111	.175*	-.009	.051	.075	.307**	-.023
9	NFC								---	.132	-.147	.085	.106	.226**	-.025	.608**
10	SE									---	-.373**	.299**	.412**	.407**	-.465**	.197*
11	SOS										---	-.232**	-.345**	-.399**	.455**	-.128
12	Extra											---	.161*	.165*	-.236**	.248**
13	Agree												---	.352**	-.404**	.137
14	Cons													---	-.415**	.136
15	Neuro														---	-.007
16	Open															---

In addition, it was found that there was no difference in the psychological discomfort among the experimental conditions, F (2, 113) = .38, p = .687, η^2 = 0.7%. Even if the personality variables that were significantly correlated with psychological discomfort were controlled (self-esteem, sense of self, extraversion, agreeableness, conscientiousness, neuroticism, and openness to experience were controlled in the ANCOVA model), there was still no significant difference in the psychological discomfort among the conditions, F (2, 106) = .72, p = .489, η_p^2 = 1.3%. This may imply that the psychological discomfort did not capture the effect of cognitive dissonance in the current study.

In fact, the evidence of a documented drive state associated with cognitive dissonance is mixed and highly qualified. For example, Elliot and Divine (1994) focused on the timing of the affect measure. Their results suggested that the participants' psychological discomfort reached its highest level immediately after finishing writing the essay but before reporting their attitude, whereas the other kinds of affects/emotions (i.e., positive emotion, negative-self index) did not differ at these two time points. They therefore concluded that a motivational state of cognitive dissonance exists, if only for a brief interval.

However, other studies found evidence of discomfort that was qualified by either personality or situational variables (see Galinsky et al., 2000, and Stapel and van der Linde, 2011), whereas Kenworthy, Miller, Collins, Read and Earleywine (2011) found that discomfort did not mediate the dissonance effect in different cognitive dissonance research paradigms in their meta-analyses. There is reason to be skeptical here. A measure of psychological discomfort cannot be taken at face value as a measure of cognitive dissonance because it may simply represent the general inner state of participants, which is related to certain of their traits (i.e. self-esteem, sense of self, the Big Five) across the experimental conditions.

4.1.4 Findings relevant to Hypothesis 4

Hypothesis 4 proposed that individuals in the high-choice compliance condition would use the first dissonance-reduction strategy that was available to them, either attitude change or trivialization, to reduce the dissonance state. Specially, only the individuals with a weak sense of self would need to apply the dissonance-reduction strategy, not those with a strong sense of self. Because the individuals with a strong sense of self have rich self-resources to reduce the dissonance in their inner self-system, no external dissonance reduction strategy was needed.

This hypothesis was also not supported. First, sense of self did not moderate the relationship between condition and attitude or between condition and importance of the event, after controlling for the pre-attitude. Second, regardless of the level of sense of self, individuals did not trivialize the proposed tuition increase event more when the importance measure was taken before, rather than after, the attitude measure. In fact, they actually rated the target proposal as more important when the importance measure was presented before the attitude measure than when the importance measure was presented later. Finally, no matter whether the final attitude was measured before or after the importance ratings, it was not reported differently.

It was not surprising that pre-attitude positively predicted both the final attitude and the participants' perceived importance of target proposal. However, the finding regarding the trivialization measure was opposite to the prediction as well as to the findings of previous research (Gosling, Denizeau, & Oberlé, 2006; Joule & Martinie, 2008; Martinie, 2003; Simon, Greenberg, & Brehm, 1995). In the current study, trivialization did not occur; in contrast, those participants even emphasized the importance of the proposed tuition increase issue if the importance measure was provided to them before the attitude measure.

But the current finding is not unique! Stalder and Baron (1998) also found a "reversed trivialization" effect for individuals with low attributional complexity.[12] These individuals trivialized the issue more in the low-choice condition than in the high-choice condition. Stalder and Baron explained the unexpected finding in term of the resemblance of the measures. They argued that the measures of the importance resemble the overall evaluation implicit in an attitude measure; therefore, positive attitude change might well be associated with less trivialization. Perhaps the same process occurred in the present study.

Another possible explanation for this finding concerns the topic of tuition increase itself. During the present severe economic recession, a major tuition increase might be viewed as a more important issue than as usual. Therefore, attempts to trivialize the issue might be less likely to occur.

On the other hand, the order of importance/attitude measures did not have an effect on the participants' final attitude. In the condition where the importance measure was taken before the final attitude measure, if the effect of trivialization did not occur, the strategy of attitude change should be applied. However, there was no difference in the final attitude between attitude/trivialization condition and trivialization/attitude condition.

4.1.5 Findings relevant to Hypothesis 5

Hypothesis 5 was proposed as a test to see if the previously unexplored phenomenon of "prospective" dissonance could be identified. It was proposed that openness to experience may be the individual difference variable that could predict the occurrence of prospective dissonance (which should result in a decision to decline to write the counter-attitudinal essay) when direct face-to-face social pressure (the presence of an experimenter) was absent. This hypothesis was tested in the online survey version of the dissonance study in which participants received no direct social pressure to agree to write counter-attitudinal essays. It was

[12] Attributional complexity refers to "the complexity of attributional schemas for explaining behaviors and events." (Stalder & Baron, 1998, p449)

hypothesized that those who were more open to experience would be more likely to agree to write a counter-attitudinal essay, whereas individuals who were more closed to experience would be more likely to decline to write the counter-attitudinal essay, regardless of the topic (tuition increase or diagnostic exam).

Although openness to experience was not correlated with the decision to write a counter-attitudinal essay on the topic of the proposed tuition increase (r = .07, p = .350), it was found to be marginally related to the decision to write a counter-attitudinal essay about a proposed senior-year diagnostic exam (r = .14, p = .070). Although these two correlations did not significantly differ from each other, the results for the topic variable replicated the findings in my pilot study, where openness to experience was also found to predict the decision to agree to write the counter-attitudinal essay toward a proposed senior-year diagnostic exam (r = .22, p = .025). However, none of the individual facets of openness to experience was specifically associated with the decision of writing the counter-attitudinal essay for the diagnostic exam in the online sample.

These findings suggest that the personality variables associated with prospective cognitive dissonance may be topic-specific. This possibility deserves to be explored in future research. For the present, the findings provide at least limited and preliminary support for the notion that people who are closed to experience anticipate dissonance about writing a counter-attitudinal essay prospectively, and that they resolve this "prospective dissonance" by simply declining to write the essay. In contrast, people who are open to experience are, depending on the topic, willing to be more "open-minded" about entertaining and writing about the points that oppose their own previous attitude.

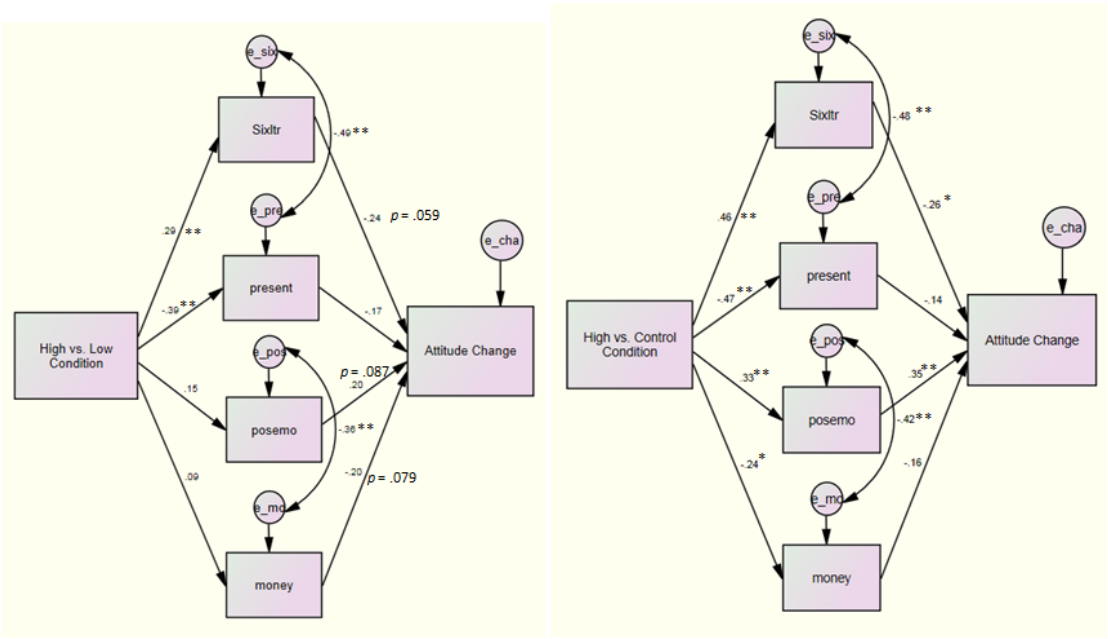
4.1.6 Findings relevant to LIWC data

The content of the written counter-attitudinal advocacy essays was analyzed using the LIWC software. The results revealed that, in the laboratory study, individuals in the high-choice compliance condition were more likely to use words of positive emotion/optimism (e.g., nice,

sweet, like) and words longer than six letters in their arguments compared to individuals in the control condition. One possible reason is that they would want to express more positive emotion to emphasize the positive side of the target proposal and to persuade others (and themselves) when they believe that they had chosen to support the tuition increase issue "freely." They may also have used more words longer than six letters in their essays to enhance the apparent strength of the arguments by means of an impressive vocabulary.

In contrast, individuals in the high-choice compliance group were less likely to use present tense words (e.g., is, does, hear) in their arguments compared to their counterparts in the control and low-choice conditions. This could be because they were more likely to talk about the issue hypothetically or more likely to address past problems and future benefits, rather than focusing on the present costs of the proposed tuition increase. In addition, individuals in the low-choice condition and high-choice compliance conditions were less likely to use money words (e.g., owe, pay), implying that they may have tried to downplay the costs of the proposed tuition increase by avoiding mentioning words related to money.

The next question is whether these content differences could mediate the dissonance effect. To answer this question, I conducted a mediation model in which the four significant LIWC variables above (i.e., words of positive emotion, words of present tense, words longer than six letters, and words related to money) were tested as potential mediators of the relationship between the experimental condition and attitude change. The results indicated that the current data supported this mediation model (See Figure 4.2). The four types of words mediated the dissonance-effect difference between the high-choice condition and low-choice condition, χ^2 (df = 5) = 3.50, p = .624, and between the high-choice condition and the control condition, χ^2 (df = 5) = 4.74, p = .449.



(a) High-choice vs. Low-choice Condition

χ^2 (df = 5) = 3.50, p = .624

GFI = .985, CFI = 1.00, standardized RMR = .044

(b) High-choice vs. Control Condition

χ^2 (df = 5) = 4.74, p = .449

GFI = .980, CFI = 1.00, standardized RMR = .066

Figure 4.2 Mediation model of LIWC variables

In addition, the results revealed that words of positive emotion were consistently a significant mediator of the dissonance effect. Individuals in the high-choice condition consistently used more words of positive emotion compared to those in the other conditions, and the more positive emotion words were reported, the more attitude change occurred. On the other hand, although words longer than six letters were also found to be used more frequently in the high-choice condition, there was actually a negative correlation between words longer than six letters and the amount of attitude change. This finding suggests that the use of words longer than six letters may actually have suppressed dissonance-based attitude change in the

present study (see MacKinnon, Krull, & Lockwood, 2000). In other words, the results were complicated.[13]

When comparing the online sample to the participants in the laboratory sample who were in the high-choice compliance and non-compliance conditions, the results showed that participants in the laboratory study might have taken the study more seriously because they were more likely to use more words longer than six letters, more articles, and to write longer essays with more total words. Finally, in both the online and the laboratory samples, individuals in the high-choice compliance condition, compared to those in the high-choice non-compliance condition, tended to report more words of positive emotion, but fewer words that concerned negative emotion, negation, and money.

These findings suggest that cognitive dissonance may not only influence individuals' final attitudes, willingness to write a counter-attitudinal essay, and their reported psychological discomfort, but may also affect the linguistic content of the counter-attitudinal essays themselves. For this reason, content analysis of the essays written in the counter-attitudinal advocacy paradigm represents an important new direction for future dissonance research.

4.2 Conclusion

The current study was designed to investigate whether personality variables, especially sense of self, would moderate the dissonance reduction behavior in the counter-attitudinal advocacy paradigm. Sense of self did prove to be important, but not as a moderator of dissonance effects. Instead, a weak sense of self seems to act as a general predictor of the "influenceability" that occurs when one agrees to think and write about the arguments for a position that one has previously not agreed with.

[13] When examining the relation of words longer than six letters and attitude change, a slightly negative linear trend was found in each condition (high-choice, low-choice, and control condition) although the correlations were not significant in the zero-order Pearson's *r* (high-choice, *r* = -.08; low-choice, *r* = -.18; and control condition, *r* = -.09). In addition, these negative linear trends were also found after partialling out the pre-attitude (high-choice, semi-partial *r* = -.08; low-choice, semi-partial *r* = -.27; and control condition, semi-partial *r* = -.11). No curvilinear relationships were detected in these conditions.

Contrary to previous theory and research, the degree of reported psychological discomfort did not mediate the relationship between the condition and the final attitude or attitude change, and sense of self also did not moderate the relationship between psychological discomfort and the final attitude/attitude change. More unexpectedly, psychological discomfort *negatively* predicted the final attitude/attitude change across conditions. The possible explanation was the measure of psychological discomfort did not capture the motivational drive of cognitive dissonance in the current study, but instead reflected individual differences in discomfort that are associated with certain personality traits (e.g., self-esteem, sense of self, and the Big Five). Thus, the negative relationship between the psychological discomfort and attitude/attitude change might actually represent the relationship between individual differences and attitude/attitude change, a possibility that deserves to be explored in future research.

Moreover, trivialization did not appear to be strategy of dissonance-reduction in the present investigations. Contrary to expectations, the participants were more likely to rate the target proposal as *more*, rather than less, important if the importance rating was obtained before the final attitude measure. A possible explanation was that the measure of importance was perceived as largely redundant with the measure of attitude in the current study, so that reducing dissonance through positive attitude change would also result in a stronger importance rating. A second possible reason is that under the current economic circumstances, tuition increase has become a more important topic for most people.

Addressing another issue, the online study investigated the role of openness to experience in "prospective" cognitive dissonance (declining to write the counter-attitudinal essay to both reduce prospective dissonance and to avoid retrospective dissonance) when the face-to-face social pressure was not presented. The findings suggest that there may be certain individual difference variables, over and above individuals' pre-attitudes, that predict the prospective dissonance, and that the individual difference variables associated with the prospective cognitive dissonance may be topic-specific.

To explore a previously unexplored issue in dissonance research, linguistic content analyses were conducted on the participants' essays with the aid of the LIWC program. Several significant differences were found. First, consistent with greater perceived commitment to writing an effective counter-attitudinal essay when perceived choice was present, words longer than six letters and words of positive emotion were more likely to be used, but words of present tense were less likely to be used in the high-choice compliance condition. Second, consistent with less private commitment to the target proposal in the absence of perceived choice, words relevant to money were found to be used more frequently in the control condition. Third, there was evidence that participants in the laboratory study might have taken the essay-writing task more seriously by using more words, more words longer than six letters, and more articles, compared to the online sample. Similarly, there was conceptually similar evidence that individuals in the high-choice compliance condition were more committed to writing an effective essay by using more words of positive emotion, but fewer words of negative emotion, negation, and money, compared to individuals in the non-compliance condition, in both the online and laboratory samples.

Finally, there was considerable evidence in the current study that the participants who chose to participate in the online study had different personalities than those who chose to participate in the laboratory study (i.e., displayed significant differences on the measures of contingencies of self-worth, need for cognition, conscientiousness, and narcissism). Although these differences were statistically controlled in the data analyses when comparing the linguistic contents between the online and the laboratory study, these findings are important because they suggest that participants might systematically "self-select" to laboratory versus online survey studies. If these self-selection biases prove to be replicable and to have some generality, researchers will have to worry greatly about the impact these personality differences might have on their research findings and how they should be interpreted. Although these personality

findings were completely unexpected, they could prove to be the most important findings to emerge in the present investigation.

Overall, the data did not support the hypotheses derived from self-affirmation theory. The data also did not support the role of strength of sense self as a moderator, psychological discomfort as a mediator, or trivialization as an alternative dissonance-reduction strategy. On the other hand, the data provided some evidence for the traditional finding of greater attitude change under a condition of high perceived choice. The study's findings also suggested that certain individual differences variables are associated with "prospective cognitive dissonance," and that these variables may have been topic-specific. Finally, linguistic content differences in the counter-attitudinal advocacy paradigm were also found.

4.3 Limitations and Future Directions

There were several limitations in the current investigation that should be addressed in future research. First, because the personality measures were obtained right before the cognitive dissonance manipulation (a difference in procedure from previous studies in which personality measures are not obtained), it is possible that completing the lengthy series of personality measures may distracted participants' attention from their counter-attitudinal act and focused it on their evaluation of themselves, resulting in both a weaker cognitive dissonance effect and in the self-affect from the personality testing influencing the participants' psychological discomfort ratings. In the future, researchers should collect their personality variables in a separate online pretesting in order to prevent these complicating influences.

Second, and possibly because of the reason noted above, the current data revealed partial support for the dissonance manipulation and revealed a non-significant difference between the high-choice and low-choice conditions. Besides the reason provided above, the other possible cause was the sample of the study. The current sample had only 30% white-American participants, and previous research has suggested that cognitive dissonance may take different form in different cultures (see Hoshino-Browne, Zanna, Spencer, Zanna, Kitayama,

& Lackenbauer, 2005; Kitayama, Snibbe, Markus, and Suzuki, 2004). The main component of cognitive dissonance is the perceived inconsistency. In an independent culture, individuals may be more likely compare their actions to their beliefs about self (i.e., self-concepts); whereas in an interdependent culture, individuals may more likely compare their actions to the normative standards of society because they perceive the cultural value of interpersonal harmony to be more important than self-consistency (Markus & Kitayama, 1991). Perhaps the weak effect of dissonance and the non-significant moderation effect of sense of self were influenced by the various ethnicities in the current sample. Future research should continue to investigate the cognitive dissonance model in different cultures.

Third, the measure of psychological discomfort might have been unduly influenced by the participants' self-evaluation as a consequence of previously completing a number of "self"-relevant personality measures, as noted above. The psychological discomfort measure may also have had the problem of a "floor effect." Future research could address the first problem by collecting the personality measures in a separate, earlier testing session, and could address the second problem by expanding the 7-point Likert scale to 9- or 11-point scale in order to distinguish more detailed differences in psychological discomfort.

Fourth, trivialization did not appear to have been used as a dissonance-reduction strategy in the current study, which might be attributable to the greater economic importance during the current recession of the topic of a tuition increase. The topic of a proposed tuition increase could be changed in future research to see if the strategy of trivialization would be applied; otherwise, the status of trivialization as an alternative dissonance reduction technique might need to be examined more skeptically.

An additional concern is whether mentioning the attitude issue early on could have resulted in a participant self-selection bias. Although the title of the study was "Attitudes toward a Specific University Proposal," the brief description of the study that followed did inform the participants that they would write an essay about a proposed tuition increase at UTA. Could

provide this information about the attitude topic led some participants to withdraw from the study at that point?

To explore this possibility, I examined the difference between participants in the current study and participants in the SONA pre-screening pool (N = 814), I found that the participants in my laboratory sample (M = 4.02, SD = 2.21, N = 160) did not have a different pre-attitude from those in the pre-screening pool (M = 3.95, SD = 2.16), Z = 0.03, p = .488; and the variance in my laboratory sample did not differ from the variance in the prescreening pool, signal-sample χ^2 (159) = 166.58, p = .324. Although not definitive, these results suggest that my result sample might represent the pre-screening participant pool without any obvious bias being evident. Similarly, I also found no difference in the mean of the pre-attitude, Z = -0.03, p = .488, and in the variance of the pre-attitude, χ^2 (147) = 147.09, p = .482, between the participants in my online study (M = 3.89, SD = 2.16, N = 148) and those in the pre-screening pool. There is no obvious sampling bias apparent in these data either.

Apart from addressing the various limitations of the present study that I have noted above, three additional lines of future research might be of particular interest as topics for future research. First, as noted above, there were individual differences between participants who preferred to participate in the online version of study and those who preferred to participate in the laboratory study. Future research should pay more attention to these apparently systematic "self-selection biases" of choosing to participate in a particular study format (online vs. laboratory) and explore their methodological, theoretical, and meta-theoretical implications.

Second, future research might also consider the new model of cognitive dissonance that was recently proposed by Fischer, Frey, Peus, and Kastenmuller (2008). This is another model of dissonance that emphasizes the self, but unlike the self-affirmation and self-consistency theories, its primary emphasis is on a new element—self-regulation. Self-regulation refers to the application of an individual's "willpower," and is essential when the individuals try to override their spontaneous reactions (see Muraven & Baumeister, 2000;

Schmeichel, Vohs, & Baumeister, 2003). Usually individuals who have performed a self-regulation task will not perform well in a subsequent self-regulation task because they have been ego-depleted. Fischer, Greitemeyer, and Frey (2008) found that individuals with depleted regulatory resources were more likely to engage in a dissonance-reduction strategy (i.e. confirmatory information-processing used in decision-making scenarios) than non-depleted individuals. They found that ego-depleted individuals were less likely to tolerate inconsistent information and experienced the inconsistency as more unpleasant and aversive compared to less-depleted individuals. Thus, they proposed self-regulation is an essential element in the use of dissonance-reduction strategies.

In the current study, self-affirmation theory was not supported, and sense of self did not moderate the dissonance-reduction usage. If the individual difference variables that I studied did not moderate the degree of dissonance-reduction, perhaps it was because none of them were directly relevant to self-regulation. Future study should consider including the element of self-regulation to explore this possibility.

Third, the LIWC data suggest that there were some important content differences among the experimental conditions. Could these content differences in participants' writings be mediators of the amount of attitude change? In the current study, four types of words were found to be used differently among conditions: words longer than six letters, words of positive emotion, words of present tense, and words related to money. The mediation analyses revealed that the use of positive emotion words did indeed mediate the effect of the condition manipulation on attitude change (see Figure 10). This effect suggests that individuals in the high-choice condition were more likely than individuals in the low-choice and control conditions to use positive emotion words, and the more positive emotion words were used in the essay, the more attitude change occurred.

On the other hand, the use of words longer than six letters was also found to mediate the effect of the condition manipulation on attitude change. However, the results were

complicated and suggested that the use of words longer than six letters may be a suppressor in the relation of the dissonance manipulation and attitude change. That is, individuals in the high-choice condition were more likely to use words longer than six letters than individuals in the other conditions, but the more words longer than six letters were used in the essay, the less attitude change was reported.

In summary, the evidence suggests that certain LIWC variables may mediate the dissonance effect in counter-attitudinal advocacy studies, but these mediation effects may be complex and take different forms, depending on the LIWC variable studied. Still, the study of essay content appears to be a promising direction for future reach on this topic.

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