This is to certify that the
dissertation entitled

NEGATIVE AFFECT AS A DANGER SIGNAL:
INVESTIGATING THE IMPACT OF DIFFERENT AFFECT
INDUCTIONS ON MESSAGE PROCESSING

presented by

MIKAYLA HUGHES

has been accepted towards fulfillment
of the requirements for the

Doctorate degree in Communication

Major Professor's Signature

4 May 2006

Date

MSU is an Affirmative Action/Equal Opportunity Institution

DATE DUE	DATE DUE	DATE DUE

NEGATIVE AFFECT AS A DANGER SIGNAL: INVESTIGATING THE IMPACT OF DIFFERENT AFFECT INDUCTIONS ON MESSAGE PROCESSING

By

Mikayla Hughes

A DISSERTATION

Submitted to
Michigan State University
In partial fulfillment of the requirements
for the degree of

DOCTOR OF PHILOSOPHY

Department of Communication

2006

ABSTRACT

NEGATIVE AFFECT AS A DANGER SIGNAL:
INVESTIGATING THE IMPACT OF DIFFERENT AFFECT INDUCTIONS ON
MESSAGE PROCESSING

By

Mikayla Hughes

The processing mode induced by the experience of negative affect is highly deliberative. This characterization of the relationship between negative affect and processing is based primarily on explicit affect inductions (i.e., appraisal based). This study hypothesizes quantitative differences in the processing style induced by explicit versus implicit (i.e., subliminal) affect inductions. One hundred eighty-three *P*s received one of three affect inductions (neutral, negative explicit, negative implicit) and read one of two persuasive messages (strong, weak) advocating a mandatory statistics course. The data are not consistent with the hypothesized processing differences between the different negative affect inductions. Instead, neutral mood *P*s perceived differences in message strength between the strong and weak messages, however, negative mood *P*s (both explicit and implicit) did not. Implications of the findings and future research directions are discussed.

This dissertation is dedicated to my two favorite men: my dad and my son, Nick.

ACKNOWLEGMENTS

I must thank my committee members Tim Levine, Sandi Smith, and Stan Kaplowitz for their time and insightful comments on my research. Additionally, I would like to thank my family for their immeasurable emotional and financial support during my time in graduate school. Finally, I am indebted to my major professor, Frank Boster. I truly appreciate all the effort, time, and kindness Dr. Boster has contributed to my development as a scholar.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

Chapter 1

LITERATURE REVIEW AND HYPOTHESIZED MODEL

Affective states influence the nature of communication behavior. Previous research has demonstrated that affect impacts a diverse range of social behavior such as split-second impression formation (Ambady & Gray, 2002), negotiation strategy selection (Forgas, 1998b), and request politeness (Forgas, 1999). Broadly defined, affect is an approach or avoidance reaction to some stimulus (Zajonc, 1980). Given this definition of affect, both mood and emotion fall under the general umbrella of affective states (Sedikides, 1995). Emotions are motivational states induced by the perceived features of a context. Moods, on the other hand, tend to be more global (i.e., not linked to context), more diffuse, and longer in duration than emotions. Regardless of whether emotion or mood inductions are employed, much of the research concerning the impact of affect on communicative behavior employs information processing as an explanatory mechanism. Stated differently, differences in behavioral outcomes, such as impression formation or request politeness, are explained by information processing differences that are induced by differing affective states (e.g., positive versus negative affect).

Negative affect is associated with more deliberate information-processing (Ambady & Gray, 2002). The positive relationship between negative affect and more deliberative processing is well established. Eagly and Chaiken (1993, p.455) suggest, however, that we have little empirical research testing the impact of higher levels of negative affect on processing. One possible reason for this lacunae is the nature of affect inductions. There are at least two ways by which the experience of affect can occur: by cognitive appraisal or preconscious approach/avoidance. Although the debate on whether

affect precedes cognition (see Lazarus, 1982; 1984; Zajonc, 1980, 1984) has long since faded from the forefront, it may be useful and even theoretically relevant to examine these two different routes to the experience of affect.

Appraisal

According to appraisal theories of emotion, cognition is antecedent to the subjective experience of affect (Lazarus, 1991; Ortony, Clore, & Collins, 1988). Appraisal refers to an interpretation of a situation. The experience of emotion is a function of the meanings people derive from their perceptions of how a situation will impact their well-being. People evaluate the significance of an interaction with respect to if and how it impacts their well-being. Specifically, the way a situation is appraised will impact the type and intensity of affective reactions.

Situations can be appraised as more or less beneficial or threatening. The perception that a situation is threatening can lead to feelings of anger, sadness, or hostility. Conversely, positively appraised situations may yield affective reactions such as happiness or excitement. When appraisal yields the perception that threat or challenge is eminent, negative feelings such as anxiety and fear may occur. For example the anticipation of an exam may prompt feelings of anxiety (Folkman & Lazarus, 1985). These constructs, beneficial and threatening appraisals, occur along two distinct dimensions, and situations can also be assessed as highly threatening and highly beneficial. For example a promotion can be appraised as highly beneficial due to the honor of receiving the position, but threatening because the new responsibilities present new opportunities for failure and being perceived as inadequate. On the other hand,

situations can be assessed as low in threat and benefit. For instance mundane activities such as washing dishes or ironing clothes offer little in the way of threat or benefit.

Regardless of the valance, the experience of emotion is comprised of three elements: thoughts, action impulses, and somatic disturbances. Thoughts consist of internal messages regarding the situation being appraised. Somatic disturbances, on the other hand, are not initiated by conscious thought. Instead somatic disturbances involve neuromuscular activity such as central nervous system efferent activity (e.g., increases in blood pressure or sweating) or facial expressions (Izard, 1993). In contrast, action impulses are motivational in nature. Perceptional selectivity and the readiness to act are examples of action impulses (Izard, 1993). For example, the readiness to flee from a threat is considered an action impulse. According to Lazarus (1984), all three elements are necessary components for people to the experience emotion.

Nonconscious Processes and Intuition

In contrast to appraisal theories, some scholars assert cognition is not necessarily antecedent to the experience of affect, and in fact, there are situations in which affect precedes cognition (Izard, 1993; Zajonc, 1980). Choices based on intuition or "a bad feeling" are affective reactions independent of internal messages. On a daily basis people make judgments based on intuition. Although many social cognitive scholars approach research with the underlying assumption that much of day to day information processing and decision making is conscious and purposeful, a growing number of researchers (e.g., Bargh & Chartrand, 1999; Langer, 1978; Schwarz, 2000) are conceptualizing the processes that produce decisions and internal messages as largely nonconscious. Bargh and Chartrand suggest that conscious processing is a limited resource that requires a good

deal of effort and is therefore utilized in moderation. For example, the processing necessary to create internal messages to bolster willpower, or resistance to desirable objects or activities (e.g., eating a whole pint of ice cream in one sitting, smoking cigarettes), is likely a limited resource. Baumeister, Bratslavsky, Muraven, and Tice (1998) found that people who exercised willpower in one instance were less likely to exercise willpower when confronted by a later unrelated temptation. On the other hand, Bargh and Chartrand characterize nonconscious processing as an effortless, quick, and unlimited resource.

Some scholars have approached different information processing systems (e.g., deliberative, heuristic) by conceptualizing the processes in terms of dual processing models (e.g., elaboration likelihood model, heuristic systematic model). These models emphasize extent of elaboration as an important mediator that explains differences in information processing outcomes (but see Kahneman, 2003 for a presentation of dual processing that emphasizes accessibility as a key construct instead of elaboration). Although elaboration, or deliberative processing, mediates social cognitive outcomes, the extent to which an action was initiated by conscious processing or by nonconscious processing is another important mediator. In some circumstances the ultimate product of information processing will not vary based on whether the processing goal was initiated by conscious activation of a goal or nonconscious activation of the same goal. Chartrand and Bargh (1996) found that processes such as impression formation and memorization produced similar results regardless of whether the goals were induced consciously or nonconsiously. It may be, however, that differences in information processing outcomes will occur based on whether the goal antecedent to processing was stimulated by the

conscious activation of affect (i.e., explicit induction) or nonconscious activation of affect (i.e., implicit induction).

Negative Affect as a Nonconscious Danger Signal

Intuition is a preconscious step that proceeds and biases conscious knowledge. These nonconscious, or intuitive, choices may be guided by negative or positive affect. Zajonc's (1968) mere exposure effect may explain behavioral manifestations of intuition. Zajonc demonstrated that, controlling for commonly encountered objects, increased exposure to an object yields more favorable evaluations of the object. In terms of intuition, the converse of feelings of familiarity is that unnerving feeling that something is wrong. Preconscious negative affect may influence decision making by biasing people against treats that have not yet been appraised. Adolphs and Damasio (2001) assert the experience of affect may be of biological advantage to humans because it operates to bias people against innate threats (e.g., snakes, heights, fire).

Bechara, Damasio, Tranel, and Damasio (1997) assert that nonconscious biases can impact conscious decision making before conscious knowledge occurs. Stated differently, people will start to avoid threat or approach reward before knowing why. Bechara et al. observed people taking part in a gambling task. *P*s were given play money and four decks of cards. *P*s took part in a game that consisted of 100 card selections. *Ps* could choose a card from any of the four decks. Two of the four decks were advantageous because over the long term playing from the decks yielded an overall gain. The other two decks were disadvantageous because over the long term they produced an overall loss. *Ps'* perception of the game was assessed after the first 20 turns and was

subsequently assessed at 10-card intervals. Also, anticipatory skin conductance responses (SCRs) were measured during the task.

Bechara et al. (1997) assert that *P*s experienced three stages of awareness of the game: the pre-hunch period, the hunch period, and the conceptual period. During the pre-hunch period *P*s started demonstrating anticipatory SCRs in reaction to the disadvantageous decks but stated that they did not understand what was occurring in the task. The hunch period was characterized by *P*s expressing suspicion about the disadvantageous decks and the occurrence of anticipatory SCRs when *P*s considered selecting from the disadvantageous decks. By the 80th turn many *P*s demonstrated conscious knowledge (i.e., which decks bad and good) and had therefore reached the conceptual period. During the conceptual period, *P*s continued to have anticipatory SCRs when considering selecting cards from the disadvantageous decks. *P*s who did not reach the conceptual period by the end of the game still acted advantageously during the game even though they never expressed conscious knowledge of the task.

Negative Affect and Processing

Although the contexts in which affect impacts information processing is somewhat complex (see Forgas, 1995), the general finding of the positive relationship between negative affect and more deliberative processing style is well established. Bless, Bohner, Schwarz, and Strack (1990) investigated whether people are differentially influenced by strong and weak arguments depending on their affective state. *P*s were exposed to either a positive or negative mood induction and then were asked to read a message, with either strong or weak arguments, advocating a tuition increase at the university. *P*s experiencing negative affect were more persuaded by strong arguments

than weak arguments. *P*s experiencing positive affect, on the other hand, did not demonstrate differential persuasion based on the strength of arguments in the message (see Table 1 for means from Bless et al.). The authors did not find a main effect for mood.

Negative mood not only increases the likelihood of deliberative information processing, but negative mood states also decrease reliance on scripts or general knowledge structures (Bless et al., 1996). Forgas (1998a) found that people experiencing a negative mood state are less likely to fall prey to the fundamental attribution error (i.e, tendency to attribute the cause of behavior to enduring traits instead of situational factors) than people experiencing positive or neutral moods. Furthermore, *P*s experiencing a negative mood, compared to those in a positive mood, demonstrated greater recall.

A number of studies investigating the impact of affect on processing tend to use explicit affect inductions. Explicit affect inductions stimulate cognitions in order to produce affective states. Common affect inductions such as movie clips (Ambady & Gray, 2002; Martin, Ward, Achee, & Wyer, Jr., 1993), remembering or imagining affect congruent experiences (Bless, et al., 1990; Wegener, Petty, & Smith, 1995), and reading affect congruent statements (i.e., Velton cards) are appraisal based (see Lazarus, 1984). Specifically, these inductions employ conscious interpretations of a situation in order to prompt the experience of affect.

Explicit Versus Implicit Affect Inductions

It is of interest to discern if there are differences in the amount of negative affect experience depending on the nature of the affect induction. Stated differently, would one observe differences in self reports of affective state based on whether *P*s were exposed to

an explicit negative affect induction or an implicit negative affect induction. It may be that implicit inductions produce greater negative affect than explicit inductions. If one were to think about explicit affect inductions in terms of causal order, then for many studies cognition precedes affect. Stated differently, cognition, or appraisal, leads to changes in the experience of affect, which in turn impacts subsequent social cognitive processes, such as decision-making and impression formation. In the appraisal model the relationship between the affect induction and any subsequent social cognitive process is mediated by internal messages stimulated by the affect induction. The implicit, or subliminal, affect induction, on the other hand, is a more direct relationship between the induction and any subsequent social cognitive process. Therefore one may observe greater effect sizes for implicit affect inductions (e.g., subliminal) than explicit affect inductions.

Cognitive tuning predicts the same pattern of data. According to Sinclair, Mark, and Clore (1994) cognitive tuning occurs when contextual cues derived from a situation provide people with information about how deliberately things should be processed. Specifically, positive affect signals that a situation is benign and negative affect signals a threatening situation. Because negative affect serves as a signal that there may be some threat in the current situation, the extent to which threat is attributable to some feature in the context (i.e., an external cause) impacts the level of deliberative and detailed oriented processing. Negative affect induced by implicit methods has no apparent link to the current context. This lack of an apparent link leads to attempts to discern a cause of the negative affective state. People have evaluative needs and tend to look to their current situation for cues to facilitate explanations for feelings of arousal; even if these feelings

are not stimulated by the current situation (Schachter & Singer, 1962). Therefore implicit methods could increase deliberative processing more than methods that induce negative affect by way of explicit procedures. This prediction is consistent with Sinclair et al.'s finding that the relationship between negative affect and deliberative processing is attenuated when people are able to attribute their affective state to an external cause. Sinclair et al. replicated Bless et al. (1990) using weather as an unobtrusive affect induction. Sinclair et al. found when they alerted people to the fact that weather can impact mood, only a main effect for argument strength was observed.

This study will address the research question aimed at discerning whether implicit negative affect inductions will promote more or less processing than explicit negative affect inductions. The Bless et al. (1990) study will be replicated employing both implicit and explicit inductions. A causal model (see Figure 1) will be tested with three levels of affect inductions: neutral, explicit negative, and implicit negative. It is hypothesized that *P*s exposed to the implicit negative affect induction will experience greater negative affect than the explicit negative and neutral affect inductions. In turn, higher levels of negative affect, compared to lower levels, will impact perceptions of message strength. The relationship between negative affect and perceived message strength will be qualified by the message strength induction such that *P*s experiencing low levels of negative affect will perceive little difference between strong and weak argument compared to *P*s experiencing high levels of negative affect. As *P*s experience higher levels of negative affect, *P*s will perceive more difference between strong and weak arguments. Perceived message strength will go on to influence posttest attitude toward taking a statistics course such that greater perceptions of message strength lead to

more positive posttest attitudes. Also, pretest attitude strength will impact posttest attitude. Specifically, more positive pretest attitudes lead to more positive posttest attitudes and more negative pretest attitudes lead to more negative posttest attitudes. Posttest attitude will impact behavioral intentions. *P*s with more favorable attitudes towards the proposed statistics requirement, compared to *P*s not demonstrating positive attitudes, will express greater intent to support the advocated statistics requirement.

Chapter 2

METHOD

Participants

One hundred ninety-one undergraduates from Michigan State University (MSU) received extra course credit for participation. Eight *P*s were dropped from the analysis due to a substantial amount of missing data resulting in a final sample size of 183. The sample was comprised of 67 males (36.6%) and 116 females (63.4%). The racial composition was 76% Caucasian, 9.3% African American, 6% Asian/Pacific Islander, 2.2% Hispanic/Latino, 1.1% Native American, .5% Arab American, and 2.7% other. Four participants did not self-report their race. The sample consisted of 23% Freshman, 19.7% Sophomore, 19.7% Junior, and 33.9% Senior. Seven *P*s did not indicate their academic standing. The average age was 20.48 years old ($SD = 3.31$).

Design

This study employed a 2 (message argument strength: weak vs. strong) X 3 (affect induction type: explicit neutral induction, explicit negative affect induction, or implicit negative affect induction) independent groups design with random assignment. Requiring a statistics course for all MSU students served as the attitude object for the persuasive message.

Overview

Approximately one week after completing a survey that included pretest attitude items, individual *P*s took part in a series of activities on a laptop computer and completed surveys. *P*s were exposed to one of three mood induction procedures: an explicit neutral affect induction, an explicit negative affect induction, or an implicit negative affect

induction[1]. Next, *P*s finished a survey that included affect induction check items. Then *P*s read a persuasive message, with either strong or weak arguments, advocating requiring statistics for all MSU students[2]. Finally, *P*s filled out several measures including posttest attitude and argument strength measures.

Procedures

The *P*s took part in two separate sessions: a mass administered survey and a laboratory session, attended by individual *P*s, approximately one week later. The mass administered survey included items measuring attitude toward requiring a statistics course for all MSU students. In addition, the survey included filler items measuring various attitude objects and personality traits. During the subsequent laboratory session *P*s were told they would fill out some surveys and take part in a series of activities on a laptop computer. *P*s were told they were taking part in a study investigating how life experiences and personality traits impact opinions about college curriculum issues. Also, *P*s were told to expect questions about required courses and the use of technology in the classroom. Also, *P*s were informed that they might be exposed to novel means of information presentation and would be asked to evaluate the presentation of information. First, *P*s read a series of statements, displayed one at a time, on the computer screen. *P*s in the explicit negative mood induction condition viewed declarative statements with a negative valence. *P*s in the explicit neutral affect condition viewed neutral declarative statements. In addition to the same declarative statements viewed in the neutral condition, *P*s in the implicit negative affect induction condition received subliminal

[1] It is possible to experience negative and positive affect concurrently. In this study, however, negative affect was induced without positive affect.

[2] The arguments employed in the persuasive messages were of consequence because they addressed a real policy at MSU. Specifically, the arguments were relevant and timely to the Ps because the university was in the process of proposing quantitative literacy requirements.

exposure to picture/word pairings intended to produce negative affect. After reading the declarative statements *P*s completed a survey that included affect induction check items. Next *P*s were asked to read a short persuasive message. Finally, *P*s were asked to complete an additional survey packet that included pretest attitude measures, argument strength, and behavioral intent items.

Instrumentation

Inductions

Explicit mood induction. A computer format adaptation of the Velten (1968) technique was employed to induce negative[3] (Velten-D) or neutral (Velten-N) affect. The original induction required *P*s to read 50 Velten statements, each statement on a separate 5 X 8 card. In the computer adapted format all *P*s, regardless of affect induction condition, viewed task instructions on the screen. *P*s were required to read each of the 50 Velton statements displayed on the screen. *P*s were instructed to focus on the statement on the computer monitor before moving on to the next statement. *P*s were able to move to the next statement by pressing the space key on the computer keyboard. See Appendix A for the Velten statements.

Implicit mood induction. *P*s in the implicit affect induction were exposed to words and pictures intended to provoke negative affect. Pictures depicting negative life experiences or facial expressions were paired with a word that described each picture. For example, a picture of a car crash with badly mangled cars was paired with the word "death," a picture of a critically ill person in a hospital bed was paired with the word

[3] It is likely that the Velten-D cards induce feelings of depression or sadness but do not make people as angry or fearful as other inductions.

"cancer," a picture of the facial expression of a person in pain was paired with the word "pain."

The implicit negative affect inducing stimuli were presented while the neutral statements (Velten-N) from the explicit negative affect induction appeared on the screen. The Velten statements were presented in the foveal region (i.e., the center of conscious visual attention) of the monitor and the subliminally presented stimuli were presented in the parafoveal (i.e., the periphery of the attended region of the monitor). Each picture/word pairing was presented for 90 ms and then subsequently masked with blurry hard to discern copy of the same image (Bargh & Chartrand, 2000). Thirty picture-word pairings were presented during the 50 statement Velten procedure. Therefore, not every Velten statement was accompanied by subliminally presented content. Also, some of the picture-word pairings were shown more than once. Determination of subliminal stimulus and Velten statement presentation (i.e., which stimuli will be presented with which statements) was held constant for all *P*s.

Argument strength. Similar to La France and Boster's (2001) argument strength induction, strong messages consisted of an advocated stance supported by a series of internally consistent and realistic premises. Conversely, weak messages had an advocated stance that did not logically follow from the premises. All messages, regardless of message strength, had the same advocated stance (i.e., statistics courses should be required for all MSU students). Also, both messages contained two arguments, each with corresponding corroborating evidence. Both the strong and weak messages were of similar length, one-sided, and at a 12^{th} grade reading level. See Appendix B for messages.

Induction Check

Affect. The extent to which *P*s experienced negative affect was measured by five semantic differential items anchored by bipolar adjectives: positive/negative, good/bad, sad/happy, gloomy/content, and elated/depressed. The category ratings were scored -4 to 4. Responses closer to the category positive, good, happy, content, and elated received higher scores.

Measures

Argument strength. The extent to which participants viewed a persuasive message as having strong arguments was measured with seven semantic differential items anchored by bipolar adjectives: compelling/not compelling, convincing/unconvincing, logical/illogical, reasonable/unreasonable, believable/not believable, plausible/not plausible, and sound/unsound (La France & Boster, 2001). The category ratings were scored 1 to 7. Responses closer to the category ratings compelling, convincing, logical, reasonable, believable, plausible, and sound received higher scores.

Attitude. Attitude towards changing the current curriculum such that all MSU students are required to take a statistics course was measured by five semantic differential items anchored by bipolar adjectives: positive/negative, good/bad, necessary/unnecessary, right/wrong, and warranted/unwarranted. The category ratings were scored 1 to 7. Responses closer to the category positive, good, necessary, right, and warranted received higher positive scores.

Intent. Intent to support the advocated statistics requirement was measured by four Likert items (see Appendix F) with seven response options ranging from strongly agree to strongly disagree. Higher scores indicate greater intent.

Chapter 3

RESULTS

Test of the Measurement Model

Confirmatory factor analyses (Hunter & Gerbing, 1982), which consist of internal consistency and parallelism tests, were employed to test the hypothesized factor structure of the items. By applying the internal consistency theorem expected correlations among the items can be calculated. Each observed correlation is subtracted from the corresponding expected correlation to produce an error term for each item. Internal consistency tests revealed that the errors calculated between items measuring the same construct were generally within sampling error of zero. The test of parallelism showed that the errors calculated between items measuring different constructs were also within sampling error of zero.

Impact of the Affect Induction on Endogenous Variables

Given the results of the confirmatory factor analyses, the five affect items were averaged to form an index of affect. This index was normally distributed with a mean of 1.30 (SD = 1.59) and had a reliability of α = .92. As shown in Table 2, the self-reported affect means for the three affect induction conditions were not consistent with the hypothesized pattern. Specifically, it was posited that *P*s in the implicit negative affect condition would have the most negative affect scores, *P*s in the explicit affect induction condition would demonstrate somewhat less negative affect scores, and *P*s in the neutral induction condition would have the least negative affect scores. A one-way ANOVA with the affect measure as the dependent variable was conducted (see Table 3 for ANOVA and planned comparisons). A planned comparison testing the predicted pattern

of means was not statistically significant, $t(180) = .54$, *ns*, $\eta_p = .08$. The neutral induction did yield self reports of affect ($M = 1.54$, $SD = 1.23$) that were greater than those produced by the explicit negative affect based induction ($M = .72$, $SD = 1.90$), $F(1,180) = 8.88$, $p < .01$, $\eta_p = .05$. *P*s in the explicit negative affect induction, however, reported more negative affect than *P*s in the implicit affect induction ($M = 1.69$, $SD = 1.37$), $F(1,180) = 12.46$, $p < .01$, $\eta_p = .06$. Mean affect for explicit negative affect induction *P*s was significantly different from zero, $t(63) = 3.01$, $p < .01$. There was no difference in self reported affect for *P*s in the neutral and implicit negative affect conditions, $F(1,180) = .29$, *ns*, $\eta_p = .00$.

The seven perceived argument strength items were averaged to form an index of argument strength. This index was normally distributed with a mean of 4.67 and standard deviation of 1.93. The index had a reliability of $\alpha = .91$. An omnibus *F* test was conducted with the affect induction as the independent variable and perceived argument strength as the dependent measure (see Table 4 for means and Table 5 for ANOVA and planned comparisons). There was no difference in perceived argument strength based on affect induction, $F(2, 180) = .87$, $p > .05$, $\eta_p = .01$. Neutral induction Ps' report of perceived message strength ($M = 4.71$, $SD = 1.51$) was not statistically different from the explicit negative affect induction ($M = 4.80$, $SD = 1.06$), $F(1,180) = .12$, $p > .05$, $\eta_p = .00$, or the implicit negative affect induction ($M = 4.48$, $SD = 1.56$), $F(1,180) = .83$, $p > .05$ $\eta_p = .00$. Additionally, perceived argument strength for the explicit negative affect induction was not significantly different from the perceived argument strength scores for the implicit negative affect induction condition, $F(1,180) = 1.64$, $p > .05$.

The five attitude items were averaged to form an index of attitude. The prestest measure of attitude was normally distributed with a mean of 3.61 (SD = 1.93) and a reliability of α = .95. For the posttest the index was normally distributed with a mean 4.28 (SD = 1.70) and a reliability of α = .93. Mean attitude change was calculated by subtracting the pretest attitude index from the posttest attitude index. The attitude change index had a reliability of .93. Mean attitude change was .67 (SD = 1.86) and the test-retest correlation between the two attitude measures was r = .48. An omnibus F test was conducted with the affect induction as the independent variable and posttest attitude as the dependent measure (see Table 6 for attitude and attitude change means and Table 7 for ANOVA and planned comparisons). There was no difference in posttest attitude due to different affect inductions, $F(2, 180) = .81, p > .05, \eta_p = .01$. Posttest attitude for neutral induction Ps (M = 4.36, SD = 1.74) was not statistically different from the explicit negative affect induction (M = 4.42, SD = 1.51), $F(1,180) = .04, p > .05, \eta_p = .00$, or the implicit negative affect induction (M = 4.05, SD = 1.56), $F(1,180) = .94, p > .05, \eta_p = .01$. Also, explicit negative affect induction Ps did not demonstrate significantly different posttest attitudes compared to implicit negative affect induction Ps, $F(1,180) = 1.44, p > .05, \eta_p = .01$.

Furthermore, there was no difference in attitude change due to differences in affect inductions, $F(2, 180) = .67, p > .05, \eta_p = .01$ (see Table 8 for ANOVA and planned comparisons). Attitude change for neutral induction Ps (M = .82, SD = 2.15) was not statistically different from the explicit negative affect induction (M = .46, SD = 1.81), $F(1,180) = 1.16, p > .05, \eta_p = .01$, or the implicit negative affect induction (M = .75, SD = 1.58), $F(1,180) = .04, p > .05, \eta_p = .00$. Additionally, attitude change for the explicit

negative affect induction was not significantly different from attitude change scores for the implicit negative affect induction condition, $F(1,180) = .79, p > .05, \eta_p = .00$.

The four intent items were averaged to form an index of behavioral intention. This index was normally distributed with a mean of 3.32 and standard deviation of 1.23. The index had a reliability of $\alpha = .82$. An omnibus F test was conducted with the affect induction as the independent variable and intent as the dependent measure (see Table 9 for means and Table 10 for ANOVA and planned comparisons). There was no difference in intent due to different affect inductions, $F(2, 180) = .18, p > .05, \eta_p = .00$. Neutral induction *P*s' behavioral intent ($M = 3.25$, $SD = 1.30$) was not statistically different from the explicit negative affect induction ($M = 3.38$, $SD = 1.16$), $F(1,180) = .36, p > .05, \eta_p = .00$, or the implicit negative affect induction ($M = 3.33$, $SD = 1.26$), $F(1,180) = .14, p > .05, \eta_p = .00$. Additionally, intent for the explicit negative affect induction was not significantly different from the intent scores for the implicit negative affect induction condition, $F(1,180) = .05, p > .05$.

In addition to the exogenous variables, the possible interaction between *P*s' sex and the affect induction on the affect measure was examined. Pignatiello, Camp, and Rasar (1986) suggest that the Velton procedure can interact with *P*s' sex such that females tend to report a stronger affective experience. Male *P*s' affect scores ($M = 1.34$, $SD = 1.42$) were not significantly different from female *P*s ($M = 1.28$, $SD = 1.69$), $t(181) = .22, p > .05, \eta_p = .00$. A 2 (sex) x 3 (affect induction) ANOVA with the affect measure as the dependent variable was conducted to discern sex interacted with the affect induction. In the present study *P*s' sex did not interact with the affect induction to impact

self reported affect scores, $F(2, 180) = .40$, *ns*, $\eta_p = .01$. Mean self reported affect scores grouped by *P*s' sex and induction condition are reported in Table 11.

Test of the Hypothesized Model

Subsequently, the causal model presented in Figure 1 was tested. The hypothesized model posits that the affect induction has a direct effect on perceptions of affect. Specifically, the implicit negative affect induction, compared to the explicit negative affect induction, will produce the greatest amount of negative affect. The explicit negative affect induction will produce more negative affect than the neutral affect induction. Subsequently, affect interacts with the message strength induction to impact perceived argument strength. As the experience of affect becomes more negative Ps will view the strong message as more strong and the weak message as more weak. On the other hand, Ps experiencing little to no negative affect will discern little difference in perceived argument strength between the strong and weak message inductions. Consequently, perceptions in argument strength and pretest attitude have an independent and direct effect on posttest attitude. As perceived argument strength increases posttest attitudes will become more positive. Pretest attitude impacts posttest attitude such that more positive pretest attitudes lead to more positive posttest attitudes and more negative pretest attitudes lead to more negative posttest attitudes. Posttest attitude goes on to impact behavioral intent such that more positive posttest attitudes lead to greater behavioral intent and more negative attitudes lead to less behavioral intent.

Due to the hypothesized interaction between one of the mediating variables (i.e., affect) and the message strength induction, the model was tested by splitting the sample into two subsamples (i.e., *P*s who received the weak message strength induction and

those who received the strong message strength induction) and testing two separate causal models. Both models must be consistent with the data for the larger model to be consistent with the data.

The data were inconsistent with the hypothesized model tested with data from *P*s who received the weak message (see Figure 2, and see Table 12 for correlations among the measures used in the path analyses). First, the predicted relationship between the affect induction and affect was not observed. Specifically, the affect induction was not substantially related to negative affect, $r(181) = .02, p > .05$. It was posited that neutral affect induction *P*s would demonstrate more positive affect, compared to both negative affect induction conditions. Also, the implicit negative affect induction was expected to produce more negative perceptions of affect than *P*s in the explicit negative affect induction condition (see Table 13 for means). Affect scores for *P*s in the explicit affect induction condition ($M = .21$, $SD = 1.84$) were significantly different from *P*s in the neutral affect induction condition ($M = 1.49$, $SD = 1.10$), $t(88) = 3.31, p > .01$ (one-tailed). Affect scores for *P*s in the implicit affect induction condition ($M = 1.53$, $SD = 1.38$) were significantly different from *P*s in the explicit negative affect induction condition, $t(88) = 3.53, p > .01$ (one-tailed). The neutral affect induction did not produce affect scores that were statistically different from the implicit negative affect induction, $t(88) = -.11$, *ns* (one-tailed).

Furthermore, the predicted relationship between affect and perceived argument strength affect was not observed, $\beta = -.06, p > .05$. For *P*s in the weak message strength induction condition, a negative relationship between affect and perceived argument strength was predicted (see Table 14 for means). Specifically, as affect moves from

negative to positive, perceived argument strength would increase. Instead, the observed path between affect and perceived argument strength was not statistically different from zero.

Perceived argument strength, $\beta = .70, p > .01$, impacted posttest attitude. Explicitly, as perceptions of message strength increased *P*s reported more positive posttest attitudes. Conversely, as perceptions of message strength decreased *P*s reported more negative posttest attitudes. The observed positive linear relationship was consistent with the hypothesized model (see Table 15 for means).

A positive linear relationship between pretest attitude and posttest attitude was predicted. As predicted, pretest attitude, $\beta = .27, p > .01$, impacted posttest attitude. Specifically, as pretest attitudes become more positive posttest attitudes become more positive.

Furthermore, posttest attitude had a significant impact on behavioral intent, $\beta = .79, p > .01$. More positive posttest attitudes led to greater behavioral intentions and more negative posttest attitudes led to lower levels of behavioral intent (see Table 16 for means). The observed path is consistent with the predicted relationship between posttest attitude and intent.

Errors too large to attribute to sampling error were obtained between the predicted and observed paths between perceived message strength and pretest attitude (residual = .37, $z = 2.34, p < .05$) and pretest attitude and intention (residual = .27, $z = 1.65, p < .05$). Given the modest size of several path coefficients and the substantial errors, the model failed to fit the data, $\chi^2(9) = 11.16, p < .05$, $RMSE = .15$.

The data were inconsistent with the hypothesized model tested with data from *P*s who received the strong message strength induction as well (see Figure 3, and see Table 17 for correlations among the measures used in the path analyses). As with the model for the weak message strength induction, the predicted relationship between the affect induction and affect was not observed. Specifically, the affect induction was not substantially related to affect, $r(183) = .07, p > .05$. Just as with the weak message strength model, it was posited that neutral affect induction *P*s would demonstrate more positive affect, compared to both negative affect induction conditions, and the implicit negative affect induction would produce higher perceptions of negative affect than in the explicit negative affect induction condition. There were no statistically significant differences in self-reported affect among the three inductions, $F(2, 89) = 1.01, p > .05$ (see Table 18 for means). Affect scores for *P*s in the explicit affect induction condition ($M = 1.29, SD = 1.83$) were not significantly different from *P*s in the neutral affect induction condition ($M = 1.59, SD = 1.35$), $t(89) = .76, p > .05$ (one-tailed) or from *P*s in the implicit negative affect induction condition ($M = 1.85, SD = 1.37,$) $t(89) = 1.42, p >$ .05 (one-tailed). The neutral affect induction did not produce affect scores that were statistically different from the implicit negative affect induction, $t(89) = -.69, p > .05$ (one-tailed).

Moreover, the predicted relationship between affect and perceived message argument affect was not observed, $\beta = .07, p > .05$. For Ps in the strong message strength induction condition, a negative relationship between affect and perceived argument strength was predicted. Specifically, as affect moves from negative to positive, perceived argument strength would decrease. Instead, the observed path between affect and

perceived argument strength was not statistically different from zero (see Table 19 for means).

As predicted, perceived message strength, $\beta = .68, p > .01$, impacted posttest attitude. As perceptions of argument strength increased *P*s reported more positive posttest attitudes and as perceptions of argument strength decreased *P*s had more negative posttest attitudes. The observed positive linear relationship was consistent with the hypothesized model (see Table 20 for means).

The hypothesized model posited a positive linear relationship between pretest attitude and posttest attitude. Specifically, as pretest attitudes become more positive, posttest attitudes become more positive. Conversely, as pretest attitudes become more negative, posttest attitude become more negative. As predicted pretest attitude, $\beta = .27, p > .01$, impacted posttest attitude.

Ultimately, posttest attitude had a significant impact on behavioral intent, $\beta = .64$, $p > .01$. This observed path is consistent with the hypothesized model. More positive posttest attitudes led to greater behavior intentions and more negative posttest attitudes led to lower levels of behavioral intent (see Table 21 for means).

The residuals for each individual link in the model were all explainable by sampling error, however, the path between the affect induction and negative affect, and the path between negative affect and perceived message strength had coefficients of a modest size. Given the modest size of two of the path coefficients and the substantial error in the test of overall model fit, the model failed to fit the data, $\chi^2(9) = 8.16, p > .05$, $RMSE = .13$.

Post-Hoc Path Model

A revised model was constructed that was consistent with the data (see Figure 4, and see Table 22 for correlations among the measures used in the path analysis). Unlike the hypothesized model, the affect induction in the revised model is split into two levels: neutral and negative. Stated differently, the negative explicit and implicit inductions are pooled together to create a negative affect induction condition. According to the revised model, perceived argument strength is a function of pretest attitude and an affect induction and message induction interaction. Specifically, *P*s experiencing neutral affect report a difference in perceived message strength for strong and weak messages. In other words, neutral mood induction *P*s view the strong message induction as stronger than the weak message induction. On the other hand, *P*s experiencing negative affect will discern little difference between the strong and weak message induction in terms of perceived argument strength.

Perceived argument strength is not only a function of the affect induction by message induction interaction but it is also a function of pretest attitude. More positive pretest attitudes lead to greater perceived argument strength and more negative pretest attitude lead to reduced perceptions of argument strength. So although both inductions interact to impact perceived argument strength, *P*s preexisting evaluation of the attitude object influenced the extent to which a message was viewed as strong.

Both pretest attitude and perceived argument strength have independent and direct effects on posttest attitude. *P*s who had more positive pretest attitudes demonstrated more positive posttest attitudes. Conversely, more negative pretest attitudes led to more negative posttest attitudes. Also, perceived argument strength had a positive linear

relationship with posttest attitude. Specifically, as perceptions of argument strength increased Ps reported more favorable attitudes.

Ultimately, posttest attitudes impact intent. Specifically, more positive posttest attitudes led to greater behavioral intentions. On the other hand, more negative posttest attitudes led to lesser behavioral intent.

The affect induction interacts with the message induction to impact perceived argument strength, $\beta = .20, p < .01$, such that neutral mood induction *Ps* who received the weak message reported lower perceived argument strength scores ($M = 4.15$, $SD = 1.68$) than neutral mood *Ps* who received the strong message ($M = 5.19$, $SD = 1.17$), $t(57) = 2.79, p < .01$. For the explicit negative affect induction there was no difference in perceived argument strength between weak ($M = 4.87$, $SD = 1.17$) and strong ($M = 4.72$, $SD = .93$) messages, $t(62) = .57$, *ns*. For the implicit negative affect induction there was no difference in perceived argument strength between weak ($M = 4.39$, $SD = 1.74$) and strong ($M = 4.57$, $SD = 1.40$) messages, $t(58) = .43$, *ns*. See Table 23 for perceived argument strength means grouped by affect induction. Pooling the negative affect inductions, there was no difference in perceived argument strength between weak ($M = 4.65$, $SD = 1.47$) and strong ($M = 4.64$, $SD = 1.18$) messages, $t(122) = .02$, *ns*. Mean perceived argument strength scores grouped by pooled negative and neutral affect are shown in Table 24.

Pretest attitude impacted perceived message strength, $\beta = .31, p < .01$. Specifically, more positive pretest attitudes led to greater perceptions of argument strength, conversely less positive attitude led to lower perceptions of argument strength (see Table 25 for means).

Posttest attitude is a function of pretest attitude and perceived argument strength. As perceptions of argument strength increased, *P*s demonstrated more positive posttest attitudes, $\beta = .69, p < .01$. Pretest attitudes influenced posttest attitudes such that more negative pretest attitudes led to more negative posttest attitudes and more positive pretest attitudes led to more positive posttest attitudes, $\beta = .27, p < .01$. In turn posttest attitudes impacted behavioral intentions.

Ultimately, more positive posttest attitudes were associated with greater behavioral intent, $\beta = .72, p < .01$. As Ps posttest attitudes became more positive, Ps demonstrated greater behavioral intentions. Conversely, as posttest attitudes became more negative, Ps exhibited fewer behavioral intentions (see Table 26 for means).

For the post-hoc path model the paths, which ranged from .20 to .72, were of an ample size. Additionally, the residuals were all explainable by sampling error and the overall test of the model's residuals was statistically insignificant ($\chi^2(4) = 1.93, p = .75, n = 183$), $RMSE = .04$.

Chapter 4

Discussion

The test of the proposed model was inconsistent with the data. The hypothesized model posited quantitative differences in processing outcomes predicated on different affect inductions. It was hypothesized that *P*s exposed to an implicit negative affect induction would experience more negative affect than *P*s exposed to an explicit negative affect induction or neutral mood induction. Additionally, *P*s exposed to an explicit negative affect induction would experience more negative affect than *P*s in the neutral affect induction condition. In turn, self-reported affect would interact with the message strength induction. Specifically, *P*s experiencing greater amounts of negative affect, compared to *P*s experiencing less negative or more positive affect, would perceive a greater difference in argument strength between strong and weak messages. Consequently perceptions of argument strength and pretest attitude would each have a direct positive impact on posttest attitudes. Eventually, more positive posttest attitudes would lead to more behavioral intentions and more negative posttest attitudes would lead to less behavioral intentions.

For the purpose of testing a path model with an endogenous interaction, the hypothesized model was split into two models: one tested with data from *P*s who received the weak message induction and the other tested with data from *P*s who received the strong message induction. Both models failed. The self-reported affect means were not consistent with the hypothesis that the implicit negative affect induction would produce the greatest amount of negative affect, followed by the explicit induction, and finally the neutral induction. Contrary to the predictions, self-reported affect was not

associated with perceived argument strength for either strong or weak message induction *P*s. Although pretest attitude and perceived argument strength do have independent and direct effects on posttest attitude, inconsistent with the model, pretest attitude has a direct impact on perceived message strength. Finally, posttest attitude does impact behavioral intention.

As stated previously, self-reports of affect were not more negative for *P*s in the implicit negative affect condition. Although the explicit negative affect condition induced more negative self-reports of affect than the neutral condition, the implicit negative affect condition produced more positive affect scores than the explicit negative affect condition and was not statistically different from the neutral affect induction.

Even though perceived argument strength was not a function of the hypothesized interaction between affect and the message strength induction, perceptions of argument strength were influenced by the interaction between the affect induction and the message induction. The implicit and explicit negative affect conditions were combined into a negative affect induction condition and compared to neutral affect induction *P*s. Neutral affect *P*s reported higher perceived argument strength scores for the strong message than for the weak message. Negative affect *P*s, however, did not perceive any differences in argument strength for the message strength induction.

Additionally, perceived argument strength was driven by pretest attitude. Specifically, more positive pretest attitudes toward the proposed statistics requirement led to more positive posttest attitudes toward the proposed requirement. Conversely, more negative pretest attitudes toward the proposed statistics requirement led to more negative posttest attitudes toward the proposed requirement.

Posttest attitude toward the proposed statistics requirement was a function of two variables: perceived argument strength and pretest attitude. Perceptions of argument strength and pretest attitude toward the proposed requirement each demonstrated a positive direct relationship with posttest attitude toward the proposed requirement. Specifically, more positive pretest attitudes toward the proposed requirement led to more positive posttest attitudes toward the proposed requirement. Perceived argument strength led to posttest attitude such that greater perceptions of strength were associated with more positive posttest attitudes and lower perceptions of strength led to more negative posttest attitudes.

The resulting posttest attitude impacted behavior intent. Posttest attitude demonstrated a positive linear relationship with behavioral intentions such that more positive posttest attitudes toward the statistics requirement led to greater intent to support the advocated statistics requirement. Conversely, more negative posttest attitudes led to lower intent to support the proposed requirement.

The hypothesized interaction between self-reported affect and the message strength induction on perceived argument strength was not supported by the data. There was, however, an interaction between the affect induction and the message strength induction on perceived message strength. *P*s in the neutral affect induction perceived a difference in argument strength between the strong and weak message, but *P*s in the pooled negative affect induction condition did not perceive a difference in argument strength between the strong and weak message. The finding that *P*s experiencing a neutral affective state can discern between a strong and weak message, but *P*s experiencing a negative affective state can not, is inconsistent with previous studies

investigating the impact of negative affect on processing. For example, Bless et al. (1990) demonstrated that sad moods, compared to happy moods, are associated with more deliberative message processing.

This study employed a similar rationale as Bless et al. (1990) in testing the affect and message processing relationship. Specifically, the degree to which people detect differences in argument strength between a strong and weak message is a proxy for degree of message processing. People who perceive little to no difference between a message defined as strong and a message defined as weak are presumed as taking part in low levels of message processing. On the other hand, people who perceive a difference between the strong and weak message, such that the strong message is viewed as stronger than the weak message, are presumed to be taking part in high levels of message processing. Applying this reasoning to the findings of this study would yield the inference that Ps who received a neutral mood induction engaged in higher levels of message processing than those who received a negative affect induction.

In order to understand these unexpected findings, a reexamination of the previous literature was conducted. A focus on differences in method between the current study and previous studies investigating mood and message processing can provide insight into the current findings. There are at least two key methodological differences between this study and previous studies regarding the link between affect and message processing: the nature of the affective comparison conditions and the message strength induction. Examination of these differences will help to ameliorate the seemingly discrepant findings of the current and previous studies.

Much of the literature on affect and message processing has focused on the impact of positive affect on processing (see Mackie & Worth, 1989; Worth & Mackie, 1987). Frequently positive affect is compared to either neutral or negative affect (see Bless et al., 1990; Bohner & Apostolidou, 1994; Bohner, Chaiken, & Hunyadi, 1994; Bohner, Crow, Erb, & Schwarz, 1992; Mackie & Worth, 1989; Sinclair et al., 1994; Worth & Mackie, 1987). It is not uncommon for researchers to characterize their findings in terms of what the experience of a positive affect does to processing (see Bless, et al.). Positive affect is associated with reliance on generalized knowledge structures and less attention to detail. Because the comparison group for these studies on the influence of positive affect are often people experiencing negative affect, negative affect would obviously be viewed as more deliberative. Comparisons of negative affect to neutral affect, independent of a reference to positive affect, are rare. Of the two experiments conducted by Bless et al. neither include neutral affect as a comparison group. Instead, the findings are based on a comparison of negative affect to positive affect.

Although it is established that negative affect, compared to positive affect, is associated with more deliberative processing, previous research provides little insight on whether negative affect would induce more deliberative processing than neutral affect. Kuykendall and Keating (1990) used positive, neutral, and negative affective states in their extension of Worth and Mackie (1987) study. Worth and Mackie looked at the impact of positive affect, relative to neutral affect, on message processing. The researchers found that people experiencing neutral affect and people experiencing negative affect developed more favorable attitudes after reading strong arguments than

after reading weak arguments. People experiencing positive affect, however, were not differentially influenced by message strength. The authors concluded that both negative and neutral affect are associated with more deliberative processing.

The findings of the current study appear to be at odds with Kuykendall and Keating (1990). Specifically, *Ps* in the negative affect condition discerned little in the way of difference between the strong and weak message induction. The seemingly inconsistent findings can be explained by examining differences in the nature of the message strength induction between the current study and previous studies investigating the affect and message processing relationship.

It is typical practice for researchers not to provide the conceptual definition on which their indication of message strength is based. Instead, many researchers determine message strength by having people rate the strength of messages in a pilot test (see Bless et al., 1990; Bless, Mackie, & Schwarz, 1992; Mackie & Worth, 1989; Mitchell, Brown, Morris-Villagran, & Villagran, 2001, Worth & Mackie, 1987). A few studies have employed the same message topic (i.e., advocating mandatory comprehensive exams) and the same messages from Petty, Harkins, and Williams (1980, Experiment 2) (Kuykendall & Keating, 1990; Sinclair, Mark, & Clore, 1994). Although Petty, Harkins, and Williams do not share the conceptual definition that guided the creation of their strong, weak, and very weak messages, inspection of the messages can yield some insight as to how the elements of what constitutes more or less strong messages differ in the current study and Kuykendall and Keating. It appears that messages high in strength employ premises that are logically relevant to the advocated position (i.e., conclusion) and present statistics and references to empirical studies to bolster the premises. Conversely, the low strength

messages provide arguments that are logically irrelevant to the advocated position (i.e., the arguments are psychologically related to the conclusion, or an informal fallacy) and give quotations, opinions, and personal examples to support the arguments. In Kuykendall and Keating's study, support for strong message premises was primarily the presentation of statistics. The support for the weak message premises was primarily narratives and opinion. Therefore supportive content in the Kuykendall and Keating strong messages was verifiable and the content in the weak message was not verifiable. Stated differently, Kuykendall and Keating confounded verifiability of message elements with message strength.

The current study, however, did not confound the presence of statistics and other verifiable message content with message strength. Introductory information about the message topic and the issue of quantitative literacy was provided in both the strong and weak message. Content presented in the form of statistics was included in this introductory information. The messages did, nonetheless, differ in terms of the presence of informal fallacies. Informal fallacies occur when the connection between a premise and conclusion is based not on standards of logic but on some psychological standard. For example the premise "college graduates will need to be familiar with statistics in order to advance in their chosen field" is logically relevant to the advocated position "all MSU students should be required to take a statistics course." On the other hand, the premise "quantitative literacy is a far more important issue than drunk and disorderly behavior on campus" is logically irrelevant to the advocated position and is an informal fallacy. The implication of the premise is that the university administration should be inclined to take care of an academic issue such as quantitative competence before taking

action on problems associated with binge drinking and other antisocial behavior associated with drinking. Although message recipients may be prone to agree with the assertion that university administration should favor academic issues over social issues, the assertion itself provides little direct logical reasoning for why statistics knowledge should be required of all college students. So although the premise is linked to the advocated position, it is not linked by logic but by psychological preference.

When considering all the elements of a message that a person examines to when determining perceived message strength, it is likely that some elements are easier to notice in a message than others. Stated differently, some message elements require less deliberative processing than other elements. Noticing the presence or absence of statistics in a message requires relatively low levels of information processing. On the other hand, attempting to detect if the link between a premise and conclusion is based on logic or psychological standard requires people to take part in more deliberative message processing. The task of discerning whether or not an argument is valid can prove to be difficult information processing task that often results in a failure to detect fallacies (Bettinghaus, Miller, & Steinfatt, 1970, Klauer, Musch, & Naumer, 2000; Steinfatt, Miller, & Bettinghaus, 1974; Woodworth & Sells, 1935). Additionally, people can have trouble detecting contradictions among the statements in a message (Otero & Kintsch, 1992).

The type of evidence and the presence or lack of informal fallacies are not likely to be the only features of a message people examine in order to determine perceptions of message strength. For the purpose of contrasting message strength inductions, however, the discussion of message strength elements that are employed will be restricted to the

ones varied in the Kuykendall and Keating (1990) study and the current study. The current study varied only message strength elements that are less obvious and require high levels of processing. The messages used for Kuykendall and Keating varied message strength elements such that people could discern differences between the strong and weak messages without taking part in high levels of processing. In other words, the two inductions differ in the minimum amount of processing necessary to able to discern differences in strength between a strong and weak message. Specifically, the Petty et al. (1980) messages employed by Kuykendall and Keating require relatively low levels of message relevant processing to discern differences in message strength but the current study requires higher levels of message processing to discern message strength difference.

Both neutral and negative affective states, compared to positive, are associated with more attention to message relevant features. Neutral affect, however, induces more deliberative message processing than negative affect. If differences in message strength can be discerned by examining message elements that require lower levels of processing, then people experiencing negative and neutral moods are expected to be able to perceive differences in message strength between the two induction levels. If, however, differences in message strength can only be discerned by looking at message elements that require a good amount of deliberative processing, one would expect people in neutral mood to detect a difference in message strength, whereas those in a negative mood would perceive little difference between the strong and weak message.

Message strength inductions can be constructed so that both the strong and weak messages have some message elements that require higher levels of processing and some

message elements that can be processed with little effort. The Petty et al. (1980) message used by Kuykendall and Keating (1990) is an example. Specifically, the strong message has no fallacies and uses statistics as supportive evidence and the weak message has fallacies and uses narratives and anecdotes as evidence. When a study induces message strength in this manner, people who take part in at least minimal levels of message relevant processing will be able to differentiate between strong and weak messages. So ultimately in the Kuykendall and Keating study, negative mood Ps did not perceived differences in message strength because they took part in high levels of message relevant processing . Instead, the differences in perceived message strength are due to negative affect Ps taking part in more message relevant processing than positive mood Ps.

Although the characterization of differences in message induction between the current and previous study can explain why the results of this study differ from previous research, it is necessary to note that the different processing styles initiated by two affective states may go beyond a quantitative difference in message relevant processing. It may be that negative affect induces people to weight differentially the internal thoughts (i.e., cognitive responses) prompted by evaluating message elements relevant to message strength judgments. When people perceive a message element judged as relevant to determining a message's strength, an internal thought is created. For example noticing statistics that support a premise could yield the response "this claim is backed up with reputable evidence" and a lack of statistics could yield the response "this claim has no third party evidence to support it." It may be that people in a negative affective state tend to differentially weight internal thoughts induced by message elements that underlie message strength. It is possible that negative affect prompts people to view strong

message elements as somewhat positive but weak message elements as especially negative and problematic. Neutral affect, on the other hand, is not expected to promote differential weighting.

In the current study, negative affect *P*s did not take part in differential weighting as evidenced by their lack of differentiation between strong and weak messages. In order for differential weighting to produce perceived differences between strong and weak messages the weak message must have message strength elements that can be processed at low levels (e.g., lack of statistical evidence, presence of anecdotes). Kuykendall and Keating's (1990) weak message did have message strength elements that can be processed at low levels, so negative affect *P*s' perceptions of message strength may be a function of differential weighting. On the other hand, the weak message in the current study employed statistics and did not use anecdotes, so negative affect *P*s' perceptions of message strength was not a function of differential weighting. Because there were not any weak message elements that could be detected by people taking part in low levels of processing, there were not any message elements available to weight differentially.

The results of the current study do not allow for testing of the possible qualitative differences in processing and outcomes initiated by negative versus neutral affect, however, the study does provide evidence consistent with the claim that neutral affect is associated with a more deliberative message processing style than negative affect. Given that the study did not include more direct indictors of processing than whether *P*s discern differences between strong and weak messages (e.g., cognitive responses, recall), the current study provides little insight into the nature of the cognitive activities that mediate the different processing styles induced by negative and neutral affect. Examination of the

differences in indication of the message strength induction between the current study and Kuykendall and Keating (1990) provides additional support for the claim that both neutral and negative affect induce message relevant processing but neutral affect, compared to negative, is associated with more deliberative message processing. The messages used by Kuykendall and Keating contain elements relevant to the determination of message strength that do not require a good deal of message relevant processing. People taking part in low levels of message relevant processing can distinguish statistics from narratives or notice the presence or absence of statistics. Conversely, the messages used in the current study employ message strength elements that require at least moderate levels of deliberative processing to be able to perceive message strength differences. So even though previous research has demonstrated that negative affect is associated with a more deliberative processing style, this finding is usually made in the context of a comparison to positive affect, or with messages that contain message strength elements that require relatively low levels of message relevant processing to perceive a difference between a strong and weak message.

Appraisal is Sufficient but Not Necessary for Mood to Impact Processing

The hypothesized model posited a relationship between the affect induction and the self-report of affect such that the implicit negative affect induction would produce more negative self-reports of affect than the explicit based negative affect induction. The rationale underlying this hypothesized relationship conceptualized unappraised negative affect (i.e., implicit negative affect) as an undesirable state that induces more elaborated processing in order to determine the cause of the negative affect. This hypothesized relationship was not supported by the data. In hindsight one would expect that by

definition unappraised negative affect would not be detectable by self-report. When the two negative affect induction conditions were pooled, however, the affect induction interacted with the message strength induction to impact subsequent perceptions of message strength. So although *P*s in the implicit negative affect induction condition did not self-report affect, *P*s in both negative affect inductions did not discern differences between the strong and weak messages.

Explicit Versus Implicit Experiences of Affect

The current study found no difference in the processing system initiated by the explicit and implicit negative affect induction. This finding is consistent with Chartrand and Bargh's (1996) finding that similar outcomes occur regardless of whether interpersonal goals were prompted consciously or nonconsciously. It may be, however, that the nature of the methodology used for the current study precluded the possibility of finding differences in processing between implicit and explicit negative affect inductions. First, as stated previously, the differences between the two levels of the message strength used for this study required some deliberative message relevant processing. If negative affect, regardless of the manner of induction, yields low levels of deliberative message relevant processing, then any possible quantitative differences in processing would not be observed in this study. Stated differently, there may be differences in the amount of message relevant processing prompted by the different affect induction, but the message strength elements used in this study that differentiated strong messages from weak are beyond the processing level of people experiencing negative affect. A study that varies the type of message strength elements employed in the message strength induction such that some elements require low levels of message relevant processing, other elements

require somewhat more deliberative levels of message relevant processing, and a remaining portion of elements require highly deliberative levels of message relevant processing, would allow for detection of possible differences.

Another aspect of methodology that prohibits observing any qualitative difference between the processing styles induced by implicit and explicit negative affect is the lack of more direct indicators of processing. Although having *P*s provide and categorize their own self-reported cognitive responses is not a direct indicator of cognition, cognitive response measures are more direct than the practice of inferring differences in processing based on whether *P*s detect differences between strong and weak messages. Also, if there is indeed a differential weighting of internal messages that occurs when experiencing negative affect, then including measures of cognitive response in a study would allow for a test of the hypothesized process. Including measures of recall or recognition would also be useful for discerning processing differences due to affective state.

Limitations

The claim that *P*s experiencing negative affect, regardless of whether they received an explicit or implicit induction, take part in less deliberative message processing than *P*s in a neutral mood is based on the assumption that implicit negative induction *P*s are in a negative affective state. *P*s in the implicit negative affect induction did not self-report experiencing more negative affect than neutral affect induction *P*s. This study would have benefited from the use of physiological measures of affect instead of a self- report affect measure. If there are differences in the magnitude of affect experienced in response to explicit versus implicit inductions of negative affect, then

physiological measures such as galvanic skin response or blood pressure are more likely to reflect this difference than self-report. Additionally, in this study extent of deliberative processing is inferred from whether *P*s perceive differences between a message defined as strong and a message defined as weak. Without a more direct indicator of processing, such as cognitive responses, one cannot rule out the possibility that differences in perceived message strength scores are not due to differences in processing but to some other phenomenon prompted by the affect induction.

Directions for Future Research

This study highlights several potential directions for future research. First, researchers employing message strength inductions may want to take into consideration how different message strength elements may require different thresholds of deliberative message relevant processing in order to influence judgments of message strength. Although this recommendation is applicable to all scholars who employ message strength inductions, it is especially relevant to researchers who use *Ps*' ability to differentiate between message strength inductions as a proxy to infer extent of deliberative message processing. The message strength induction used in this study differs from the inductions that are commonly employed in the literature. Message strength inductions usually define strong and weak messages not in terms of conceptual definitions but in terms of pilot test results. Stated differently, strong messages are messages that *P*s view as strong and weak messages are messages that *P*s view as weak. Lack of conceptually derived message strength inductions inhibit better understanding of the process underlying the ability to differentiate strong and weak messages. Without a conceptual definition to guide construction of the message strength induction, one can only say *P*s processing at a

more deliberative level see the difference between strong and weak messages because they see a certain message as strong and different message as weak. The previous explanation is common among researchers using a dual processing approach and is circular in its explanation of the message strength processing relationship (Stiff, 1986; Stiff & Boster, 1987). With a conceptual definition underlying the message strength induction, however, one can say *P*s processing at a more deliberative level view differences between strong and weak messages because *P*s based their evaluations on specific message strength elements and these elements required more processing effort.

A second, but related avenue for future research concerns a more direct methodology for determining whether people in negative affective states simply take part in less deliberative message relevant processing than people experiencing neutral affect, or if there are qualitative differences in the processing styles induced by the different affective states. This study does not present data to support the inference that negative affect *P*s based their judgments of strength on easier to process elements of message strength but neutral affect *P*s are able to detect more difficult process elements. This hypothesis could be tested by varying affect and the complexity of message strength elements used in strong and weak messages, and measuring perceived message strength and cognitive responses. Such a design would also allow for investigating possible qualitative processing differences between negative and neutral affect (i.e., differential weighting of internal messages).

Finally, future research investigating the impact of affect on processing would benefit from the use of physiological measures of affect. Although this suggestion is especially relevant for studies attempting to differentiate between implicit and explicit

inductions of negative affect, it may be advantageous for studies employing only explicit affect inductions as well. Self-report measures of affect require *P*s to introspect about their internal states. Even though the current and previous studies using affect inductions provide self-report affect scores reflective of some degree of awareness of affect state, it may be that using self-reports as an induction check attenuates the relationship between induction and induction check. Self-reports rely on the accuracy of introspection. Previous researchers have pointed out that introspection can produce impaired judgments of self (Nisbett and Wilson, 1977; Wilson, 1985). Millar and Tesser (1989) assert that introspection may yield accurate insights when the judgment relevant content reflected upon is primarily cognitive. As the judgment relevant insights become more affective, however, introspection may not yield very accurate judgments. Self-reporting one's own affective state may have some cognitive elements but the endeavor is far from being primarily cognitive. Decreasing reliance on self-report methods of measuring affect by using physiological methods may not only increase the magnitude of correlation observed between an affect induction and induction check, but also allow for observation of affective states that have not yet been appraised and therefore have few if any cognitive elements.

APPENDICES

APPENDIX A

Tables

Table 1

Bless, Bohner, Schwarz, and Strack (1990) Experiment 1

Mood Induction	Weak Arguments	Strong Arguments
	Attitude Change	
Good	3.0	5.4*
Bad	3.0	7.3*
Control group	3.3	
	Recommended Fee	
Good	47.78	53.98*
Bad	45.63	59.29*
Control group	48.44	

Note: From "Mood and Persuasion: A Cognitive Response Analysis," by H. Bless, G. Bohner, N. Schwarz, and F. Strack, 1990, Personality and Social Psychology Bulletin, 16, p.336. Copyright 1990 by the Society for Personality and Social Psychology, Inc. Adapted with permission. The recommended fee is given in deutsche marks. The possible range of values for approval is 1 (strongly disapprove) to 9 (strongly approve). The control group did not receive a mood induction nor a persuasive message. *$p < .05$ for differences from the control group.

Table 2

Mean Affect Scores Presented by Affect Induction Conditions

Affect Induction	Mean Affect Score	Standard Deviation	Sample Size
Neutral	1.54	1.23	59
Explicit	.72	1.90	64
Implicit	1.69	1.37	60

Table 3

Analysis of Variance for Affect Induction Impact on Affect Scores

Source	*df*	*F*	η_p	*p*
Affect Induction	2	7.31	.08	.01
Neutral vs. Explicit	1	8.88	.05	.00
Neutral vs. Implicit	1	.29	.00	.59
Explicit vs. Implicit	1	12.46	.06	.00
Within-group error	180			

Table 4

Mean Perceived Argument Strength Scores by Affect Induction

Affect Induction	Mean Affect Score	Standard Deviation	Sample Size
Neutral	4.71	1.51	59
Explicit	4.80	1.06	64
Implicit	4.48	1.56	60

Table 5

Analysis of Variance for Affect Induction Impact on Argument Strength Scores

Source	*df*	*F*	η_p	*p*
Affect Induction	2	.87	.01	.42
Neutral vs. Explicit	1	.12	.00	.73
Neutral vs. Implicit	1	.83	.00	.36
Explicit vs. Implicit	1	1.64	.01	.20
Within-group error	180			

Table 6

Mean Attitude and Attitude Change Scores by Affect Induction

Affect Induction	Pretest Attitude	Posttest Attitude	Attitude Change
Neutral	3.54	4.36	.82
Explicit	3.96	4.42	.46
Implicit	3.30	4.05	.75

Table 7

Analysis of Variance for Affect Induction Impact on Posttest Attitude Scores

Source	*df*	*F*	η_p	*p*
Affect Induction	2	.81	.01	.45
Neutral vs. Explicit	1	.04	.00	.84
Neutral vs. Implicit	1	.94	.01	.33
Explicit vs. Implicit	1	1.44	.01	.23
Within-group error	180			

Table 8

Analysis of Variance for Affect Induction Impact on Attitude Change Scores

Source	*df*	*F*	η_p	*p*
Affect Induction	2	.67	.01	.51
Neutral vs. Explicit	1	1.16	.01	.28
Neutral vs. Implicit	1	.04	.00	.85
Explicit vs. Implicit	1	.79	.00	.38
Within-group error	180			

Table 9

Mean Intent Scores by Affect Induction

Affect Induction	Mean Intent	Standard Deviation	Sample Size
Neutral	3.25	1.30	59
Explicit	3.38	1.16	64
Implicit	3.33	1.26	60

Table 10

Analysis of Variance for Affect Induction Impact on Intent Scores

Source	*df*	*F*	η_p	*p*
Affect Induction	2	.18	.00	.84
Neutral vs. Explicit	1	.36	.00	.55
Neutral vs. Implicit	1	.14	.00	.71
Explicit vs. Implicit	1	.05	.00	.82
Within-group error	180			

Table 11

Mean Self-Reported Affect Scores by Sex and Induction Type

Affect Induction	Mean Strength Score		Standard Deviation		Sample Size	
	Male	Female	Male	Female	Male	Female
Neutral	1.35	1.64	.92	1.36	19	40
Explicit	.87	.63	1.74	1.99	22	42
Implicit	1.72	1.67	1.36	1.40	26	34

Table 12

The Correlations Among Constructs For The Weak Message Induction

Construct	Affect Induction	Affect	Perceived Argument Strength	Pretest Attitude	Posttest Attitude	Intent
Affect Induction						
Affect	.02					
Perceived Argument Strength	.06	-.06				
Pretest Attitude	-.07	-.13	.37**			
Posttest Attitude	-.08	-.05	.80**	.53**		
Intent	.04	-.05	.73**	.48**	.79**	

** Correlation is significant at the $p = .01$ level (2-tailed)

Table 13

Mean Affect Scores for Hypothesized Weak Message Strength Model

Affect Induction	Mean Affect Score	Standard Deviation	Sample Size
Neutral	1.49	1.10	27
Explicit	.21	1.84	34
Implicit	1.53	1.38	30

Table 14

Mean Perceived Message Strength for Hypothesized Weak Message Strength Model

Affect Induction	Mean Perceived Argument Strength	Standard Deviation	Sample Size
Neutral	4.15	1.68	27
Explicit	4.87	1.17	34
Implicit	4.39	1.74	30

Table 15

Mean Attitude and Attitude Change for Hypothesized Weak Message Strength Model

Affect Induction	Mean Pretest Attitude	Mean Posttest Attitude	Mean Attitude Change
Neutral	3.44	4.01	.56
Explicit	4.16	4.48	.32
Implicit	3.11	3.66	.55

Table 16

Mean Intent Scores for Hypothesized Weak Message Strength Model

Affect Induction	Mean Affect Score	Standard Deviation	Sample Size
Neutral	3.00	1.38	32
Explicit	3.17	1.19	30
Implicit	3.51	1.08	30

Table 17

The Correlations Among Constructs For The Strong Message Induction

Construct	Affect Induction	Affect	Perceived Argument Strength	Pretest Attitude	Posttest Attitude	Intent
Affect Induction						
Affect	.07					
Perceived Argument Strength	-.22*	-.07				
Pretest Attitude	-.03	-.13	.23*			
Posttest Attitude	-.05	.20	.74**	.43**		
Intent	.02	.06	.52**	.64**		

* Correlation is significant at the $p = .05$ level (2-tailed)

** Correlation is significant at the $p = .01$ level (2-tailed)

Table 18

Mean Affect Scores for Hypothesized Strong Message Strength Model

Affect Induction	Mean Affect Score	Standard Deviation	Sample Size
Neutral	1.59	1.35	32
Explicit	1.29	1.83	30
Implicit	1.85	1.37	30

Table 19

Mean Perceived Message Strength for Hypothesized Strong Message Strength Model

Affect Induction	Mean Perceived Argument Strength	Standard Deviation	Sample Size
Neutral	5.19	1.17	32
Explicit	4.72	.93	30
Implicit	4.57	1.40	30

Table 20

Mean Attitude and Attitude Change for Hypothesized Strong Message Strength Model

Affect Induction	Mean Pretest Attitude	Mean Posttest Attitude	Mean Attitude Change
Neutral	3.61	4.65	1.04
Explicit	3.74	4.35	.61
Implicit	3.49	4.45	.96

Table 21

Mean Intent Scores for Hypothesized Strong Message Strength Model

Affect Induction	Mean Affect Score	Standard Deviation	Sample Size
Neutral	3.45	1.38	32
Explicit	3.17	1.19	30
Implicit	3.51	1.08	30

Table 22

The Correlations Between Constructs

Construct	Interaction	Perceived Argument Strength	Pretest Attitude	Posttest Attitude	Intent
Interaction					
Perceived Argument Strength	.21**				
Pretest Attitude	.02	.31**			
Posttest Attitude	.11	.77**	.48**		
Intent	.10	.64**	.45**	.72**	

** Correlation is significant at the $p = .01$ level (2-tailed)

Table 23

Mean Perceived Argument Strength Scores

Affect Induction	Mean Strength Score		Standard Deviation		Sample Size	
	Weak	Strong	Weak	Strong	Weak	Strong
Neutral	4.15	5.19	1.68	1.67	27	32
Explicit	4.87	4.72	1.17	.93	34	30
Implicit	4.39	4.57	1.74	1.40	30	30

Table 24

Mean Perceived Argument Strength Scores with Pooled Negative Affect Induction

Affect Induction	Mean Strength Score		Standard Deviation		Sample Size	
	Weak	Strong	Weak	Strong	Weak	Strong
Neutral	4.15	5.19	1.68	1.67	27	32
Negative	4.65	4.64	1.47	1.18	64	60

Table 25

Attitude and Attitude Change by Affect Induction and Message Strength Induction

Affect Induction	Pretest Attitude	Posttest Attitude	Attitude Change
		Weak Message	
Neutral	3.44	4.01	.56
Negative	3.67	4.19	.43
		Strong Message	
Neutral	3.61	4.65	1.04
Negative	3.61	4.40	.78

Table 26

Mean Intent by Affect Induction and Message Strength Induction

Affect Induction	Mean Intent	Standard Deviation	Sample Size
		Weak Message	
Neutral	3.00	1.19	27
Negative	3.37	1.26	64
		Strong Message	
Neutral	3.45	1.38	32
Negative	3.34	1.14	60

APPENDIX B

Figures

Figure 1. Hypothesized Model

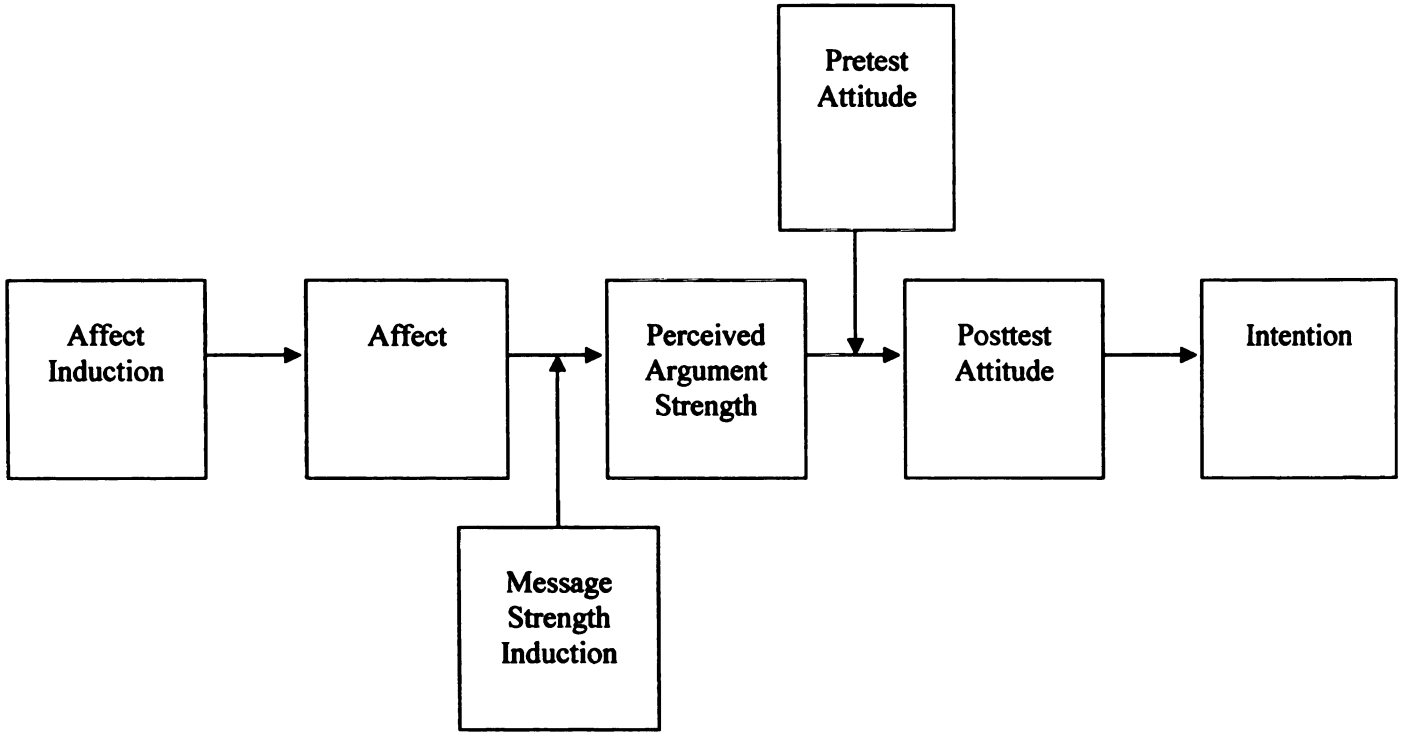
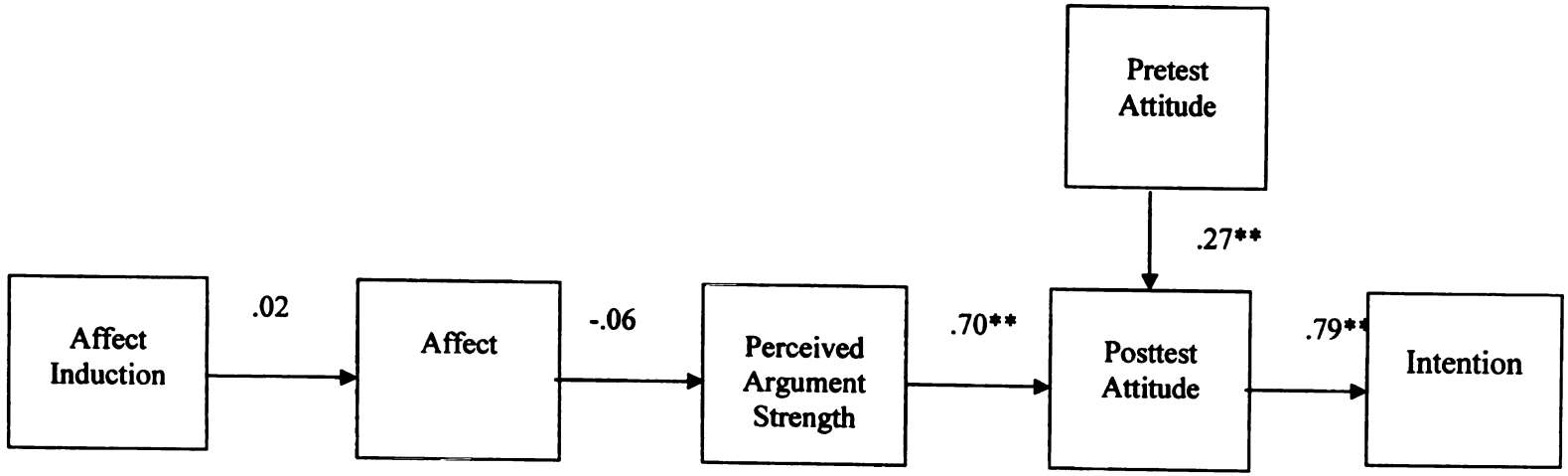
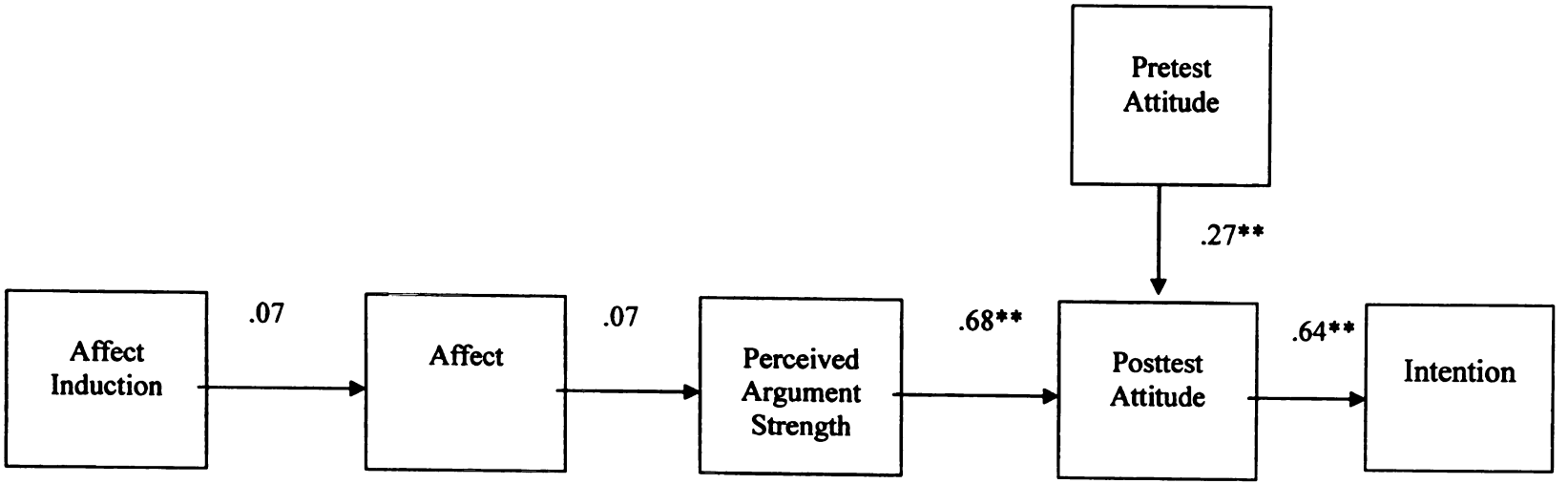


Figure 2. Hypothesized Model Weak Message Strength with Path Coefficients



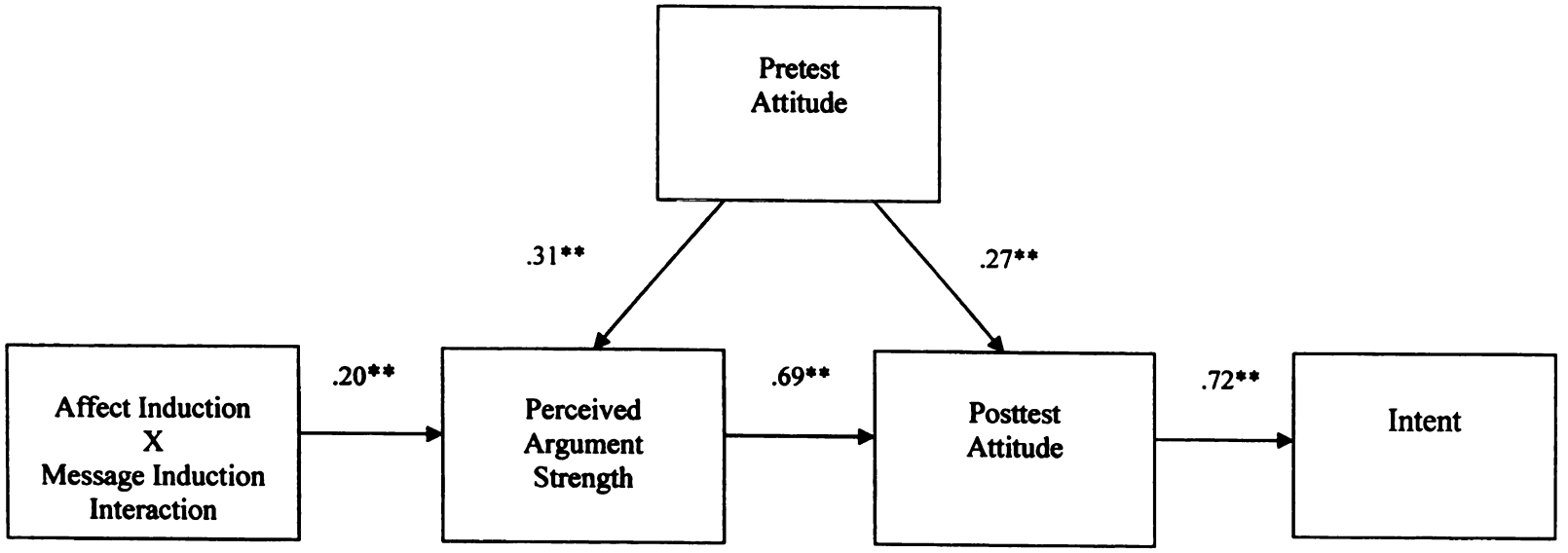
χ^2 (9) = 11.16, p = .27, n = 183
** p < .01
RMSE = .15

Figure 3. Hypothesized Model Strong Message Strength with Path Coefficients



χ^2 (9) = 8.16, p = .52, n = 183
** p < .01
RMSE = .13

Figure 4. Revised Model



χ^2 (4) = 1.93, p = .75, n = 183
** $p < .01$
RMSE = .04

APPENDIX C

Affect Inductions

Instructions for Neutral Statements

You will see a series of statements, each presented one at a time, on the screen. Please read each of the following statements to yourself. Then read each of the statements out loud. Concentrate on each of the statements as they appear on the screen, and make an effort to continue to do so until you are able to move on to the next statement. You can move on to the next statement by pressing the space bar.

Neutral Mood Statements

1. Japan was elected to the United Nations almost fourteen years after Pearl Harbor.

2. At the end appears a section entitled "bibliography notes."

3. We have two kinds of nouns denoting physical things: individual and mass nouns.

4. The book or any part thereof must not be reproduced in any form.

5. Agricultural products comprised seventy percent of the income.

6. Saturn is sometimes in conjunction, beyond the sun from the earth, and is not visible.

7. Some streets were still said to be listed under their old names.

8. The system is supervised by its board of regents.

9. There is a large rose-growing center near Tyler, Texas.

10. Many states supply milk for grammar school children.

11. The typography, paper, and bind were or the highest quality.

12. The Orient Express travels between Paris and Istanbul.

13. The desk was old, and scratched into its surface was a surplus of dates, initials, and pleading messages.

14. There isn't scientific explanation for every U.F.O. sighting.

15. The Hope diamond was shipped from South Africa to London through the regular mail service.

16. The review is concerned with the first three volumes.

17. The ship was ancient, and would soon be retired from the fleet.

18. Slang is a constantly changing part of the language.

19. There is a small article in the local newspaper which indicates acceptance of the kidnappers' terms.

20. There are some forms in which no oath is required.

21. 99.1% of Alaska is owned by the federal government.

22. Two men dressed as repairmen will appear shortly after the van pulls up.

23. The wood was discolored as if it had been held in a fire.

24. A light was noticed in the dark outside, and it moved eerily towards the house.

25. Painting in a few other Non-European countries is treated in a separate volume.

26. A recent study revealed that one half of all college students were unable to find summer jobs.

27. Provoked arousal and orientation are accompanied by steeper negative shifts.

28. The names on the Christmas mailing list are alphabetically ordered.

29. Significantly, these changes occur during the full moon.

30. West Samoa gained its independence in 1965.

31. The magazines' report was slanted, as usual.

32. The map would prove useless as a beginning guide.

33. The speaker outlined a plan whereby the current deficits could be eliminated.

34. Black and white pictures are arranged in ten sections.

35. The voices come only at night, and whisper words, terrible words.

36. The papers had been front-paging it for days.

37. The notices made it clear that coffee breaks were being limited

38. No man worked harder than he.

39. Potter wrote numerous satires on social cynicism.

40. The doorkeeper was dressed in red.

41. During the next ten years, the group participated in politics.

42. The organization depended on the people for support.

43. It was their sixth consecutive best seller.
44. It all fitted in with the officer's story.

45. The merger did not change the company's policy.

46. The mansion was rented by the delegation.

47. Ninety occupations were listed as eligible for the grads in business.

48. Utah is the beehive state.

49. Changes were made in transport of lumber after the border incident.

50. The Chinese language had many dialects, including Cantonese, Mandarin, and Wu.

Instructions for Negative Statements
You will see a series of statements, each presented one at a time, on the screen. Please read each of the following statements to yourself. Then read each of the statements out loud. Concentrate on each of the statements as they appear on the screen, and make an effort to continue to do so until you are able to move on to the next statement. You can move on to the next statement by pressing the space bar.

Don't worry about the reading errors which often occur in unfamiliar situations. You have completed forms regarding past experiences. Later you will be asked to fill out an addition survey concerning life experiences. Your ability to complete later tasks will depend on your willingness to be receptive and responsive to the idea in each statement. Concentrate and focus on the idea in each statement. Some participants find it helpful to visualize a scene in which they had or would have such a feeling or thought.

Negative Mood Statements

1. Today is neither better nor worse than any other day

2. However, I feel a little low today

3. I feel rather sluggish now

4. Sometimes I wonder whether school is all that worthwhile

5. Every now and then I feel so tired and gloomy that I'd rather just sit than do anything

6. I can remember times when everybody but me seemed full of energy

7. Too often I have found myself staring listlessly into the distance, my mind a blank, when I definitely should have been studying

8. It has occurred to me more than once that studying is basically useless, because you forget almost everything you learn anyway

9. People annoy me; I wish I could be by myself

10. I've had important decisions to make in the past, and I've sometimes made the wrong ones

11. I do feel somewhat discouraged and drowsy---- maybe I'll need a nap when I get home

12. Perhaps college takes more time, effort, and money than it's worth

13. I'm afraid the war in Iraq may get a lot worse

14. I just don't seem to be able to get going as fast as I used to

15. There have been days when I felt weak and confused, and everything went miserably wrong

16. Just a little bit of effort tires me out

17. I've had daydreams in which my mistakes kept occurring to me---- sometimes I wish I could start over again

18. I'm ashamed that I've caused my parents to needlessly worry

19. I feel terribly tired and uncaring to things today

20. Just to stand up would take a big effort

21. I'm getting tired out. I can feel my body getting exhausted and heavy

22. I'm beginning to feel sleepy. My thoughts are drifting

23. At times I've been so tired and discourage that I went to sleep rather than face important problems

24. My life is so tiresome---- the same old thing day after day depresses me

25. I couldn't remember things well right now if I had to

26. I just can't make up my mind; it's so hard to make simple decisions

27. I want to go to sleep ---- I feel like just closing my eyes and going to sleep right here

28. I'm not very alert; I feel bushed and kind of sad

29. I've doubted that I'm a worthwhile person

30. I feel worn out. My health may not be as good as it's supposed to be

31. It often seems that no matter <u>how</u> hard I try, things still go wrong

32. I've noticed that no one seems to really understand or care when I complain or feel unhappy

33. I'm uncertain about my future

34. I'm discouraged and unhappy about myself

35. I've stayed awake at night worrying so long that I hated myself

36. Things are worse now than when I was younger

37. The way I feel now, the future looks boring and hopeless

38. My parents never really tried to understand me

39. Some very important decisions are almost impossible for me to make

40. I feel tired and depressed; I don't feel like working on the things I know I must get done

41. I feel horribly guilty about how I've treated my parents at times

42. I have the feeling that I just can't reach people

43. Things are easier and better for other people than for me. I feel like there's no use in trying again

44. Often people make me very upset. I don't like to be around them

45. It takes too much effort to convince people of anything

46. I fail in communicating with people about my problems

47. It's so discouraging the way people don't really listen to me

48. I've felt so alone before, that I could have cried

49. I'm so tired

50. I just don't care about anything. Life just isn't any fun

APPENDIX D

Persuasive Messages

Weak message

Currently, all MSU students are required to take 3 to 5 credits of math from a list of eligible math courses or achieve a score of 19 or higher on a proctored version of the MSU Math Placement exam. Statistics courses are included in the list of eligible math courses but students can earn their required math credits without ever learning about statistics. MSU has created a Quantitative Literacy Task Force to address the issue of low levels of mathematic ability among college students. At MSU in the 2004-05 year, of over 7,000 entering freshman, approximately 3,000 freshman achieved Math Placement exam scores well below what is expected of students entering college. Increasing student knowledge of fundamental concepts of statistics is among the recommendations made by the Quantitative Literacy Task Force.

Every college educated adult should have working knowledge of statistics. The university wide curriculum should be changed so that all MSU students are required to take a 3 credit statistics class. This requirement should only be waved if students can demonstrate competence on a general statistics exam.

Other universities are altering their curriculum so that their graduates understand and can interpret statistics. MSU should have the same courses as other universities. When other universities began to regulate on campus tailgating activities, MSU's administration took notice and adopted tailgating regulations on campus. Although MSU's administration should be concerned about the conduct and social activities of its students, the academic endeavors of MSU's students should be of the greatest importance. Quantitative literacy is a far more important issue than drunk and disorderly behavior on campus. MSU's curriculum should be altered to reflect the belief that the quantitative literacy of students is more important than regulating students' social activities.

All college graduates should be "numerically literate". Knowledge of algebra and basic math operations are not the only things people should know to be "numerically literate". Understanding statistical concepts, beyond what an average is, is part of being "numerically literate". Failing to ensure that college graduates are "numerically literate" is just as bad as high schools allowing students who cannot read to graduate. College graduates who do not understand heteroscedasticity or standard error are hardly equipped to function in day to day life as adults, let alone obtain and succeed at supervisory positions. Without understanding variance and regression beta weights, college graduates will be ill prepared to make simple choices. Allowing college students who are not able to perform regression analyses or analysis of covariance to graduate only sets these numerically illiterate students up for failure in life.

Strong message

Currently, all MSU students are required to take 3 to 5 credits of math from a list of eligible math courses or achieve a score of 19 or higher on a proctored version of the MSU Math Placement exam. Statistics courses are included in the list of eligible math courses but students can earn their required math credits without ever learning about statistics. MSU has created a Quantitative Literacy Task Force to address the issue of low levels of mathematic ability among college students. At MSU in the 2004-05 year, of over 7,000 entering freshman, approximately 3,000 freshman achieved Math Placement exam scores well below what is expected of students entering college. Increasing student knowledge of fundamental concepts of statistics is among the recommendations made by the Quantitative Literacy Task Force.

Every college educated adult should have working knowledge of statistics. The university wide curriculum should be changed so that all MSU students are required to take a 3 credit statistics class. This requirement should only be waved if students can demonstrate competence on a general statistics exam.

Adults in today's society are constantly bombarded by information. Much of this information comes in statistical form. Information relevant to health and well-being is often conveyed with numbers. Almost on a daily basis, newscasters and internet sites inform the public of the latest study telling people what they should or should not do to avoid various health risks. These recommendations sometimes conflict and take a lot of time and effort to implement into one's lifestyle. Given that this is important information that may be hard to use, it is essential to be able to evaluate these recommendations. If a person is not familiar with statistical concepts then they will have little basis to evaluate these diverse suggestions about health.

Regardless of the career field, all professionals must utilize statistics to some extent. The reason that statistics are used in so many different industries is that it provides an objective way to compare things. Almost all fields need to make comparisons. Schoolteachers and administrators need to understand what methods of teaching are most effective. Comparing achievement scores among schools is a common way to figure out what is effective. Statistics are utilized in the music industry, marketing, business, the entertainment industry, and in countless other fields. Many employers, regardless of the industry, expect their employees to make informed decisions. Often these decisions must be based in part on statistics. Lack of statistical knowledge might hinder college graduates from advancing in their chosen field because they do not have the skills to make the important decisions.

APPENDIX E

Affect Measure

Affect Measure

For EACH pair of adjectives (e.g., good/bad; positive/negative), please put a checkmark in the space that most accurately represents **how you feel right now.**

Positive	___:	___:	___:	___:	___:	___:	___:	___:	___	Negative
Bad	___:	___:	___:	___:	___:	___:	___:	___:	___	Good
Happy	___:	___:	___:	___:	___:	___:	___:	___:	___	Sad
Gloomy	___:	___:	___:	___:	___:	___:	___:	___:	___	Content
Elated	___:	___:	___:	___:	___:	___:	___:	___:	___	Depressed

APPENDIX F

Argument Strength Measure

Argument Strength Measure

For EACH pair of adjectives (e.g., logical/illogical; compelling/not compelling), please put a checkmark in the space that most accurately represents how you feel about **the message you just read.**

Compelling	___:	___:	___:	___:	___:	___:	___	Not compelling
Convincing	___:	___:	___:	___:	___:	___:	___	Unconvincing
Illogical	___:	___:	___:	___:	___:	___:	___	Logical
Plausible	___:	___:	___:	___:	___:	___:	___	Not Plausible
Unsound	___:	___:	___:	___:	___:	___:	___	Sound

APPENDIX G

Attitude Measure

Attitude Measure

For EACH pair of adjectives (e.g., good/bad; right/wrong), please put a checkmark in the space that most accurately represents how you feel about **changing the university mathematics requirement so that all students that do not pass a general statistics exam must take a 3 credit statistics course.**

Positive	___:	___:	___:	___:	___:	___:	___	Negative
Bad	___:	___:	___:	___:	___:	___:	___	Good
Necessary	___:	___:	___:	___:	___:	___:	___	Unnecessary
Wrong	___:	___:	___:	___:	___:	___:	___	Right
Warranted	___:	___:	___:	___:	___:	___:	___	Unwarranted

APPENDIX H

Intent Items

Intent Items

1. I will talk to my friends about taking a statistics course.

Strongly Disagree	Disagree	Slightly Disagree	Neutral	Slightly Agree	Agree	Strongly Agree

2. I will support the university's stance that statistics is a necessary element of a college education.

Strongly Disagree	Disagree	Slightly Disagree	Neutral	Slightly Agree	Agree	Strongly Agree

3. I would sign a petition advocating making statistics a university wide requirement.

Strongly Disagree	Disagree	Slightly Disagree	Neutral	Slightly Agree	Agree	Strongly Agree

4. If I heard someone argue against the need to take a statistics course I would talk to that person about why it is a good idea to take a statistics course.

Strongly Disagree	Disagree	Slightly Disagree	Neutral	Slightly Agree	Agree	Strongly Agree

References

Adolphs, R., & Damasio, A. R. (2001). The interaction of affect and cognition: A neurobiologial perspective. In J. P. Forgas (Ed.) *Handbook of Affect and Social Cognition* (pp. 27-49). Mahwah, NJ: Lawrence Erlbaum.

Ambady, N., & Gray, H. M. (2002). On being sad and mistaken: Mood effects on the accuracy of thin-slice judgments. *Journal of Personality and Social Psychology, 83*(4), 947-961.

Bargh, J.A., & Chartrand, T. L. (1999). The unbearable automaticity of being. *American Psychologist, 54*(7), 462-479.

Baumeister, R. F., Bratslavsky, E., Muraven, M., & Tice, D. M. (1998). Ego depletion: Is the active self a limited resource? *Journal of Personality and Social Psychology*, 74, 1252-1265.

Bechara, A., Damasio, H., Tranel, D. & Damasio, A. R. (1997). Deciding advantageously before knowing the advantageous strategy. *Science*, 275, 1293-1295.

Bettinghaus, E., Miller, G, & Steinfatt, T. (1970). Source evaluation, syllogistic content, and judgments of logical validity by high- and low-dogmatic persons. *Journal of Personality and Social Psychology, 16*(2), 238-244.

Bless, H., Bohner, G., Schwarz, N., & Strack, F. (1990). Mood and persuasion: A cognitive response analysis. *Personality and Social Psychology Bulletin*, 16, 332-346.

Bohner, G., & Apostolidou, W. (1994). Mood and persuasion: Independent effects of affect before and after message processing. *The Journal of Social Psychology, 134*(5), 707-709.

Bohner, G., Chaiken, S., & Hunyadi, P. (1994). The role of mood and message ambiguity in the interplay of heuristic and systematic processing. *European Journal of Social Psychology*, 24, 207-221.

Bohner, G., Crow, K., & Erb, H. (1992). Affect and persuasion: Mood effects on the processing of message content and context cues and on subsequent behavior. *European Journal of Social Psychology*, 22, 511-530.

Chartrand, T. L., & Bargh, J. A. (1996). Automatic activation of impression formation and memorization goals: Nonconscious goal priming reproduces effects of explicit task instructions. *Journal of Personality and Social Psychology, 71*(3), 464-478.

Forgas, J. P. (1998a). On being happy and mistaken: Mood effects on the fundamental

attribution error. *Journal of Personality and Social Psychology, 75*(2), 318-331.

Forgas, J. P. (1998b). On feeling good and getting your way: Mood effects on negotiator cognition and bargaining strategies. *Journal of Personality and Social Psychology, 74*(3), 565-577.

Forgas, J. P. (1999). On feeling good and being rude: Affective influences on language use and request formulations. *Journal of Personality and Social Psychology, 76*(6), 928-939.

Hunter, J.E. (1982). Unidimensional measurement, second order factor analysis and causal models. In B.M. Straw & L.L. Cummings (Eds.), *Research in Organizational Behavior*, (Vol 4, pp. 267-320). Greenwich, CT: JAI Press.

Izard, C. E. (1993). Four systems for emotion activation: Cognition and noncognitive processes. *Psychological Review, 100*(1), 68-90.

Kahneman, D. (2003). A perspective on judgment and choice. *American Psychologist, 58*(9), 697-720.

Klauer, K. C., Musch, J., & Naumer, B. (2000). On belief bias in syllogistic reasoning. *Psychological Review, 107*(4), 852-884.

Kuykendall, D., & Keating, J. P. (1990). Mood and persuasion: Evidence for the differential influence of positive and negative states. *Psychology and Marketing, 7*(1), 1-9.

La France, B. H., & Boster, F. J. (2001). To match or mismatch? That is only one important question. *Communication Monographs, 68*(30), 211-234.

Langer, E. J. (1978). Rethinking the role of thought in social interaction. In J. H. Harvey, W. Ickes, & R. F. Kidd (Eds.), *New directions in attribution research* (Vol. 2, pp. 35-58). Hillsdale, NJ: Erlbaum.

Lazarus, R. S. (1991). *Emotion and adaptation.* New York: Oxford University Press.

Mackie, D. M., & Worth, L. T. (1989). Cognitive deficits and the mediation of positive affect in persuasion. *Journal of Personality and Social Psychology*, 57, 27-40.

Millar, M. G., & Tesser, A. (1989). The effects of affective-cognitive consistency and thought on the attitude-behavior relation. *Journal of Experimental Social Psychology*, 25, 189-202.

Mitchell, M. M., Brown, K. M., Morris-Villagran, M., & Villagran, P. D. (2001). The effects of anger, sadness, and happiness on persuasive message processing: A test of the negative state relief model. *Communication Monographs, 68*(4), 347-359.

Nisbett, R. E., & Wilson, T. E. (1977). Telling more than we can know: Verbal reports on mental processes. *Psychological Review*, 84, 231-259.

Ortony, A., Clore, G. L., & Collins, A. (1988). *The cognitive structure of emotions*. New York: Cambridge University Press.

Otero, J., & Kintsch, W. (1992). Failures to detect contradictions in a text: What readers believe versus what they read. *Psychological Science, 3*(4), 229-235.

Petty, R. E., Harkins, S. G., & Williams, K. D. (1980). The effects of group diffusion of cognitive effort on attitudes. *Journal of Personality and Social Psychology*, 38, 81-92.

Pignatiello, M. F., Camp, C. J., & Rasar, L. A. (1986). Musical mood induction: An alternative to the Velten technique. *Journal of Abnormal Psychology, 95*(3), 295-297.

Schachter, S., & Singer, J. (1962). Cognitive, social, and physiological determinants of emotional state. *Psychological Review*, 69, 379-399.

Schwarz, N. (2000). Social judgment and attitudes: Warmer, more social, and less conscious. *European Journal of Social Psychology*, 30, 149-176.

Sinclair, R. C., Mark, M. M., & Clore, G. L. (1994). Mood related persuasion depends on (mis)attributions. *Social Cognition*, 12, 309-326.

Steinfatt, T. M., Miller, G. R., Bettinghaus, E. P. (1974). The concept of logical ambiguity and judgments of syllogistic validity. *Speech Monographs*, 41, 317-328.

Stiff, J. B. (1986). Cognitive processing persuasive message cues: A meta-analytic review of the effects of supporting information on attitude. *Communication Monographs*, 53, 75-89.

Stiff, J.B., & Boster, F. J. (1987). Cognitive processing: Additional thoughts and a reply to Petty, Kasmer, Haugtvedt, and Cacioppo. *Communication Monographs*, 54, 250-256.

Velton, E. A. (1968). A laboratory task for induction of mood states. *Behavior Research and Therapy*, 8, 473-482.

Wegener, D. T., Petty, R. E., & Smith, S. M. (1995). Positive mood can increase or decrease message scrutiny: The hedonic contingency view of mood and message processing. *Journal of Personality and Social Psychology*, 69, 5-15.

Wilson, T. D. (1985). Strangers to ourselves: The origins and accuracy of beliefs about one's own mental states. In J. H. Harvey & G. Weary (Eds.), *Attribution: Basic issues and applications* (pp. 9-36). New York: Academic Press.

Woodworth, R. S. (1935). An atmosphere effect in formal syllogistic reasoning. *Journal of Experimental Psychology*, 18, 451-460.

Worth, L. T., & Mackie, D. M. (1987). Cognitive mediation of positive affect in persuasion. *Social Cognition, 5*(1), 76-94.

Zajonc, R. B. (1968). Attitudinal effects of mere exposure. *Journal of Personality and Social Psychology, 9*(No. 2, Pt. 2).

Zajonc, R. B. (1980). Feeling and thinking: Preferences need no inferences. *American Psychologist*, 35, 151-175.